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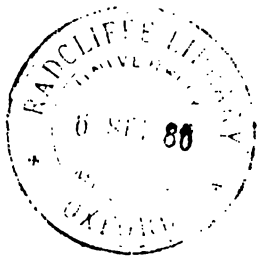

To be Published in Three Parts

PART I INCLUDES THE HEAD AND NECK.

„ III WILL INCLUDE THE ABDOMEN AND LOWER EXTREMITY.

REGIONAL SURGERY

INCLUDING

SURGICAL DIAGNOSIS

A MANUAL FOR THE USE OF STUDENTS

PART II

THE UPPER EXTREMITY AND THORAX

BY

F. A. SOUTHAM, M.A., M.B.OXON., F.R.C.S.ENG.,

ASSISTANT-SURGEON TO THE MANCHESTER ROYAL INFIRMARY; SURGEON TO THE CLINICAL HOSPITAL FOR WOMEN AND CHILDREN; ASSISTANT-LECTURER ON SURGERY IN THE OWENS COLLEGE SCHOOL OF MEDICINE

LONDON
J. & A. CHURCHILL
11, NEW BURLINGTON STREET
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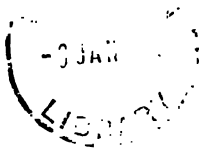

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PART II

THE UPPER EXTREMITY AND THORAX

CHAPTER XXIX

FRACTURE OF CLAVICLE

Fracture of { Acromial extremity. / Shaft. / Sternal extremity.
Separation of Epiphysis.

366. The clavicle may be fractured in any part of its course, more commonly about its middle, less frequently at either its sternal or acromial extremity. *Fracture of Clavicle.*

Though fracture may be produced as the result of direct application of force, *e. g.* a severe blow, yet it is far most frequently the result of indirect violence, *e. g.* a fall on the shoulder, or upon the hand when the arm is extended.

1. *Middle of Shaft.*—In fracture through the shaft, the bone usually gives way at its weakest point, viz., about its centre, just at the junction of the two curves. 1. Middle of Shaft.

The line of fracture is sometimes transverse, but more commonly, and especially when the result of indirect violence, it is oblique; and under these circumstances the amount of displacement is usually considerable.

Displacement of Fragments. — *The inner fragment* usually remains unaffected, being retained in its place

by the antagonistic action of the sterno-mastoid above and the pectoralis major, subclavius and rhomboid ligament below; though in many cases it appears to be displaced forwards, the skin being tightly stretched over it, this is in reality due to the depression of the inner extremity of the outer fragment backwards and behind it.

The outer Fragment, owing to the weight of the arm, which drags upon it, is usually displaced downwards, while by the action of the muscles which pass to it from the chest it is drawn somewhat inwards and forwards; hence its outer or acromial end is displaced downwards, inwards, and forwards, while its inner or fractured end is drawn inwards and backwards, so that it lies behind (very rarely in front of) the fractured end of the inner fragment, sometimes on the same level, sometimes above it.

Symptoms.—Flattening and lowering of the shoulder, which is also drawn forwards and inwards, being approximated to the middle line; pain at the seat of injury; impaired movement of the arm, with inability to raise it; inclination of the head and neck to the affected side; the elbow is often supported by the opposite hand, to take off the weight of the limb; if the finger is laid over the seat of fracture, crepitus can generally be detected on raising and rotating the shoulder, and at the same time pain will be produced.

The prominence formed by the fractured end of the inner fragment and the depression over the inner end of the outer fragment will generally be plainly perceptible beneath the skin, though, of course, these signs will vary with the position of the fractured ends, the displacement in transverse fracture being often very slight.

2. Sternal Extremity.

2. *Sternal Extremity.*—Fracture of the sternal end

of the clavicle, either internal or external to the attachment of the rhomboid ligament, is an injury of rare occurrence.

In Fracture external to the Rhomboid Ligament, the displacement is often considerable, the outer fragment being drawn downwards and forwards.

In Fracture internal to the Rhomboid Ligament, which is not so common as the preceding, there is not, as a rule, much displacement of the fragments.

3. *Acromial Extremity.*—Fracture of the acromial end of the clavicle is of much more frequent occurrence, and two varieties are described, according as the bone is broken between or external to the conoid and trapezoid ligaments. 3. Acromial Extremity.

Between Conoid and Trapezoid Ligaments.—In this situation there is very little, if any, displacement of the fragments; on rotating the shoulder crepitus is produced, and perhaps slight irregularity will be felt at the seat of injury.

External to Conoid and Trapezoid Ligaments.—In this situation there is a marked displacement of the outer fragment, its articular surface being turned forwards and inwards, with a slight inclination downwards, so that it lies nearly at a right angle with the rest of the bone, the position of which is not materially altered. This triple displacement of the outer fragment is due to the weight of the arm and the action of the muscles passing from the chest to the shoulder.

367. *Separation of the Epiphysis* of the clavicle, an extremely thin plate of bone at its sternal extremity, has been described as occurring in young subjects. Separation of Epiphysis.

368. An incomplete or greenstick fracture of the clavicle is often met with in children, the shaft of the bone being merely bent or only partially broken, Incomplete Fracture.

the periosteum in many instances remaining untorn.

Complications.

369. Fractures of the clavicle, when the result of direct violence, may be compound or comminuted; in these injuries, which are, however, of rare occurrence, the neighbouring large vessels, *e. g.* internal jugular or subclavian veins, are liable to be wounded.

Method of Repair.

370. Owing to the difficulty of keeping the broken ends of the bone in a state of absolute rest, fractures of the clavicle invariably unite by provisional callus, and in cases when treatment has been neglected, or there is much displacement of the fragments, this is often excessive in amount, giving rise to a large swelling surrounding the shaft of the bone at the seat of injury.

In many instances it is extremely difficult, especially when some interval has elapsed since the receipt of the injury, to distinguish between this condition and other swellings of the shaft of the bone (**372**), *e. g.* inflammatory, or due to the presence of a new growth; but the history of an injury, and the marked deformity which is usually present to a greater or less degree, owing to the displacement of the fragments, will generally assist in diagnosis.

CHAPTER XXX

DISLOCATION OF CLAVICLE

Dislocation of { Sternal extremity . { Forwards. / Backwards. / Upwards. / Acromial extremity = Dislocation of Scapula (385).

Dislocation of the Clavicle may occur at either its sternal or acromial extremity; the latter injury is, however, more commonly described as dislocation of the acromial process of the scapula (**385**).

371. *Dislocation of the Sternal end* may take place in one of three directions, viz., forwards, upwards, or backwards. Dislocation downwards is impossible, owing to the position of the cartilage of the first rib. Dislocation of Sternal End of clavicle.

Cause.—Violence applied to the shoulder when the scapula is fixed, so that the clavicle is forcibly driven in towards the middle line.

1. *Forwards.*—Dislocation forwards, the most common form of displacement, may be either partial or complete. 1. Forwards.

a. Partial.—There is slight projection forwards of the sternal end of the bone, readily reducible on slight pressure, but at once reproduced, when the pressure is taken off.

b. Complete.—The end of the bone can be seen and felt as a well-marked prominence beneath the skin in front of the sternum; the depressions normally present above and below the clavicle are exaggerated; the tip of the shoulder is approximated to the mesial line,

Dislocation of Sternal end of Clavicle.

and the movements of the arm are considerably impaired.

The dislocation can be readily reduced on forcing the shoulder outwards and pressing the end of the bone backwards; but, owing to the shallowness of the articular surface of the sternum, it will at once be reproduced on taking off the pressure.

In intra-thoracic tumours (782), innominate or subclavian aneurism, &c., owing to pressure from behind, a considerable amount of displacement forwards of the sternal extremity of the clavicle may be produced.

2. Backwards.

2. *Backwards.*—Dislocation backwards is of much rarer occurrence.

It is characterised by a depression where the sternal extremity of the bone should be; the articular surface of the sternum, behind which lies the displaced end of the bone, can be felt beneath the skin; the shoulder is approximated to the mesial line; the movements of the upper extremity are impaired; owing to pressure of the displaced bone upon the trachea, œsophagus, and vessels of the neck, dyspnœa, dysphagia, and congestion of the vessels of the head may be produced.

In cases of extreme lateral curvature (697) of the spine, considerable displacement backwards of the sternal end of the clavicle, associated with great exaggeration of its normal curvature, is sometimes seen.

3. Upwards.

3. *Upwards.*—Dislocation upwards is of extremely rare occurrence.

When present, the deformity is very characteristic, the end of the bone being displaced upwards and resting upon the upper border of the sternum, behind the sternal attachment of the sterno-mastoid muscle.

CHAPTER XXXI

AFFECTIONS OF THE CLAVICLE

372. *An enlargement or swelling of the clavicle* may be due to various causes, viz.: Enlargement of Clavicle.

- Enlargement of Clavicle
  - Inflammatory
    - Periostitis
      - Simple (373).
      - Syphilitic (374).
    - Excessive formation of Callus after Fracture (370).
    - Necrosis, when the sequestrum is surrounded by a sheath of new bone (448).
  - New Growths
    - Exostosis (381).
    - Sarcoma (382).

373. *Simple Periostitis.*—Inflammation of the periosteum covering the clavicle may be acute or chronic, limited or diffused. Simple Periostitis.

1. *Acute.*—Acute periostitis may be produced as the result of injury, exposure to wet or cold, or it may follow one of the exanthemata: it is characterised by the formation of a hot, painful swelling in the course of the shaft of the bone, either circumscribed or more or less diffused, plainly perceptible beneath the soft parts covering it, which, after a time, participating in the inflammation, become brawny, œdematous, and more or less reddened. 1. Acute.

In the early stage the swelling will be firm, tense, and extremely tender to the touch; but if, as not unfrequently happens, suppuration ensues, pus forming between the periosteum and the bone,—"periosteal abscess,"—it becomes soft and fluctuating. If the abscess is opened or bursts externally, the shaft of the bone will be found bare and exposed, "acute necrosis" of

the portion of bone, which has been stripped of its periosteum and consequently deprived of its main blood-supply, having been produced (**376**).

As a general rule this condition is attended by more or less constitutional disturbance, with elevation of temperature, especially towards night, when the pain is generally increased.

2. Chronic.

2. *Chronic.*—Chronic Periostitis may result from any of the same causes, but is most commonly met with in cases of syphilis (**374**). In necrosis (**376**) of the shaft of the clavicle, the sequestrum is sometimes invaginated or surrounded by a sheath of new bone, thrown out by the surrounding periosteum, and in consequence of this, a considerable enlargement or thickening of the bone may be produced (**376**).

Syphilitic Periostitis. 1. Congenital.

374. *Syphilitic Periostitis.*—Periostitis of the clavicle is not unfrequently found in the subjects of congenital or acquired syphilis.

1. *Congenital Syphilis.*—In infants or young children, the subjects of congenital syphilis, an enlargement of the sternal end of the clavicle is sometimes seen, the result of periostitis, often associated with inflammatory changes attacking the soft growing tissue which lies between the epiphysis and the shaft of the bone, "telostitis" or "epiphysitis" (**375**).

Under proper treatment the inflammation may subside, and the swelling gradually disappear, or it may ossify and remain as a permanent nodular swelling: in exceptional cases suppuration may ensue, and the sterno-clavicular joint becoming involved (**755**), the epiphysis may become detached from the shaft of the bone: under these conditions the soft tissue over the joint becomes red and inflamed, fluctuation will be evident, and if the abscess is opened or bursts exter-

Syphilitic Periostitis.

nally, the shaft of the bone from which the epiphysis is detached will be found bare and denuded of periosteum: in other instances, as described (375), separation of the epiphysis may take place without any suppuration attending the process. In these cases other evidences of congenital syphilis can generally be detected, and more than one bone is often affected.

2. Acquired.

2. *Acquired Syphilis.*—Localised inflammations of the periosteum are not uncommonly met with in the early stages of constitutional syphilis, giving rise to the so-called "*secondary node.*"

This usually presents itself as a circumscribed bossy swelling, varying in size, single or multiple, situated superficially, and plainly perceptible beneath the skin at some point on the shaft of the bone; in some cases firm and hard, in others soft, doughy, and semi-fluctuating, tender to the touch, and accompanied by pain, which is always worse at night.

Under proper treatment the swelling usually becomes absorbed, or it may undergo ossification forming a syphilitic exostosis (381); in exceptional cases it may soften and break down, giving rise to the presence of an abscess.

There will usually be a history or other evidence of the constitutional affection, and in many cases other bones will be found similarly affected.

In the nodes which are found in the later stages ("*tertiary nodes*") there is, in addition to a simple inflammatory periostitis, a deposit of gummatous material in and upon the surface of the bone. Under these circumstances the shaft of the bone may become so much weakened that fracture may very readily occur.

In the early stage the symptoms are somewhat similar to those which characterise the secondary node, though, as a general rule, they are attended by less pain. Another feature characteristic of the tertiary node is its tendency to soften and break down instead of becoming absorbed or undergoing ossification. When this is the case, evidences of suppuration will be visible externally, the skin covering the swelling becomes thinned and reddened, fluctuation will be perceptible, and when the abscess opens bare bone will probably be detected with a probe.

Epiphysitis.

375. *Epiphysitis.*—Inflammation of the epiphysial (or sternal) extremity of the clavicle is sometimes met with in young subjects, occasionally in connection with congenital syphilis (**374**).

The general course and symptoms of the affection will be the same as in the case of the same condition attacking the humerus (**415**).

In many instances the sterno-clavicular joint becomes involved (**755**), and if suppuration ensues, separation of the epiphysis will probably take place. This latter result is much more frequently met with in simple than in syphilitic epiphysitis.

Necrosis.

376. *Necrosis.*—The general symptoms, &c., will be the same as those described (**448**).

Rickets.

377. *Rickets.*—In rickets (**451**) the sternal extremity of the clavicle is often somewhat enlarged, and, owing to the softening and yielding of the shaft of the bone, its normal curvatures are in many cases much exaggerated.

Hypertrophy.

378. *Hypertrophy of Clavicle.*—Cf. Hypertrophy of humerus (**455**).

Osteitis Deformans.

379. *Osteitis Deformans.*—In osteitis deformans (Pt. I, 33) the clavicle is often involved, the shaft of the bone

becoming thickened, slightly increased in length, unnaturally curved, and generally misshapen.

Increased Curvature.

380. *Exaggeration of the Normal Curves* of the clavicle is met with in cases of rickets (**451**); lateral curvature of the spine (**697**); badly-set fractures (**370**); osteitis deformans (**379**); osteo-malacia (**452**), &c.

Tumours.

The Tumours or New Growths attacking the clavicle are most commonly either sarcomata or exostoses.

Exostoses.

381. *Exostoses.*—In rare instances the clavicle may become the seat of cancellous exostoses (**460**), similar to those often met with near the articular ends of the shafts of the other long bones.

Enlargement of the little spine-like projection of bone normally present, and situated on the anterior surface of the clavicle, at a little distance from its acromial end, is sometimes seen, giving rise to a distinct prominence, plainly perceptible beneath the skin, and resembling an exostosis. In most cases this condition is symmetrical, both clavicles being generally found similarly affected.

Sarcomata.

382. *Sarcomata.* — Sarcomatous tumours (**461**) of either the central or periosteal variety may attack the clavicle, the latter being the most common.

They usually present themselves as rapidly-growing tumours, springing from the shaft of the bone, and soon attaining a considerable size, with smooth outline or somewhat lobulated and irregular surface, and in many cases of unequal consistence.

In the early stage it is often somewhat difficult to distinguish them from simple inflammatory enlargement of the bone (**372**), but their rapid increase in size, in spite of treatment, the absence of much pain, and of any evident signs of inflammatory action, and in many instances their unequal consistence, will generally serve

to distinguish between the two conditions; in many cases, however, recourse must be had to exploratory puncture before a diagnosis can be definitely made.

Disease of Sterno-clavicular Joint.

383.—*Disease of Sterno-clavicular Joint.*—Cf. (**755**).

CHAPTER XXXII

FRACTURE OF SCAPULA

Fracture of Scapula { Body. / Acromion. / Coracoid Process. / Neck.

384. *Fractures of the Scapula* may involve its body, neck, acromion, or coracoid process. Fracture of Scapula.

1. *Body.*—Fracture through the body of the scapula is usually the result of direct violence, and is often associated with injury to the subjacent ribs. It is not, however, an accident of very common occurrence, for the thick layers of muscle (Supra- and Infra-spinatus) overlying the bone, and those beneath it (Subscapularis and Serratus Magnus), form, as it were, soft pads which serve to protect it. 1. Body.

The fracture usually affects the portion of bone which lies below the spine, running across it in an oblique or transverse direction; or, it may extend in a vertical direction right through the spine.

Symptoms. — Abnormal mobility and crepitus can generally be detected on moving the shoulder and upper part of the scapula with one hand, while the other hand is laid flat upon, or made to fix, the lower portion of the bone. In muscular subjects, and when the fracture involves the infra-spinous fossa, there will often be very slight, if any, displacement of the fragments; when, however, the fracture runs through the

spine, one or other of the fragments can often be felt to project beneath the skin.

2. Acromion.

2. *Acromion.*—Owing to its exposed position, forming as it does the tip of the shoulder, the acromion process is more frequently fractured than any other portion of the bone, usually as the result of direct violence. The fracture may take place through the tip of the process, or near its base, separating a larger or smaller portion of the bone.

Symptoms.—Abnormal mobility and crepitation can be readily detected on raising and rotating the shoulder. More or less deformity is present, the shoulder losing its rounded form and becoming somewhat depressed owing to the outer fragment being drawn downwards by the weight of the arm; on raising the arm so as to bring the fragments in apposition, the deformity at once disappears.

On running the finger along the spine and acromion, an irregularity or marked depression can be felt at the seat of fracture. More or less pain is complained of at the seat of fracture and the movements of the arm are much impaired.

There are two affections which simulate very closely fracture of the acromion, viz. non-union of the acromial epiphysis, a condition which is sometimes present from birth, and certain cases of rheumatic arthritis of the shoulder joint (**417**), for in this affection osteophytic deposits about the acromion are sometimes found lying loose and moveable beneath the skin, and under these circumstances crepitation can usually be detected.

3. Coracoid Process.

3. *Coracoid Process.*—Fracture of the coracoid process is very rarely met with, lying as it does in a hollow protected by the clavicle above, the wall of the thorax internally, and the head of the humerus externally. It

is usually produced as the result of severe direct violence, and is sometimes associated with dislocation of the humerus or fracture of some other part of the scapula.

Symptoms. — When uncomplicated with any other injury, there will be no alteration in the shape of the shoulder, and the only symptoms present will be mobility of the broken fragment, with pain and crepitus on manipulation, and more or less displacement downwards owing to the contraction of the biceps muscle; if, however, the strong coraco-clavicular ligament remains intact, the latter symptom will only be present to a very slight extent.

4. *Neck.*—Fracture of the neck of the scapula is of such extremely rare occurrence, that it has been doubted whether this injury can even take place. 4. Neck.

Two varieties have, however, been described, according as the fracture involves the anatomical or surgical neck of the bone.

α. Through Anatomical Neck. — In this form, the glenoid process only is separated from the rest of the bone.

β. Through Surgical Neck.—In this form the fracture takes place through the constricted portion of the bone, opposite the notch in the superior costa, the coracoid process being included in the separated portion.

Symptoms.—The symptoms of fracture through the *surgical neck* are very similar to those of dislocation of the humerus into the axilla (430); viz. there is flattening and lowering of the shoulder, with prominence of the acromion and a depression beneath it; the arm is lengthened and somewhat separated from the side; the head of the humerus can be felt in the axilla.

The injury differs, however, from dislocation in the

following points; the coracoid process is displaced and moves with the arm on passive movement; on raising the arm, it can readily be replaced in its normal position, and at the same time crepitus is produced, but on allowing it to drop, the deformity at once reappears; an irregular mass of bone can be felt in the axilla very different to the smooth rounded prominence formed by the head of the humerus, which alone is present in cases of dislocation; abnormal mobility is also present.

In fracture through the *anatomical neck*, the symptoms will be very similar, except that the coracoid process preserves its normal relation and does not move with the arm.

Somewhat similar symptoms may be produced in cases of dislocation of the humerus, complicated with fracture through the glenoid cavity.

CHAPTER XXXIII

DISLOCATION OF SCAPULA

Dislocation of Scapula { From the Clavicle. / From beneath the Latissimus Dorsi. / From Paralysis of Serratus Magnus.

385. *Dislocation of the Scapula.*—The scapula may undergo three different forms of displacement, to each of which the term "dislocation" is applied. Dislocation of Scapula.

a. Its acromial end may become displaced from the outer extremity of the clavicle, an injury which was formerly described as dislocation of the acromial end of the clavicle.

β. Its inferior angle may slip from beneath the latissimus dorsi.

γ. In cases of paralysis of the serratus magnus, considerable displacement of the scapula is often produced.

1. *From the Clavicle.*—Dislocation of the acromion process of the scapula from the clavicle may take place in either an upward or downward direction. 1. From Clavicle.

a. Dislocation downwards, owing to the shape of the articular surfaces and the weight of the arm which tends to drag the scapula downwards, is by far the most common variety; it is generally produced as the result of direct violence. The symptoms are usually well-marked; there is flattening and depression of the shoulder with apparent lengthening of the arm; the prominence of the outer end of the clavicle can be

plainly seen and felt beneath the skin, lying, as it does, above the acromion process, which appears depressed; movement is limited and pain is experienced on attempting to raise the arm.

The dislocation can usually be readily reduced on drawing the shoulder backwards and outwards, raising the arm, and pressing downwards the end of the clavicle, but it at once returns on taking off pressure.

β. *Dislocation upwards*, is of much rarer occurrence; the symptoms are very similar, except that the acromion process lies above the outer end of the clavicle, forming a distinct prominence beneath the skin.

2. From beneath Latissimus Dorsi.

2. *From Beneath the Latissimus Dorsi.*—In rare instances, as the result sometimes of raising the arm above the head to an unnatural extent, the inferior angle of the scapula slips from beneath the upper border of the latissimus dorsi, the muscle then lying between the shoulder-blade and the ribs.

As the result of this displacement, the lower portion of the scapula, being no longer bound down to the walls of the thorax, projects at a considerable angle from the trunk, "scapula alata," giving a peculiar and characteristic winged appearance to the back.

3. From Paralysis of the Serratus Magnus.

3. *From Paralysis of the Serratus Magnus.*—In paralysis of this muscle, owing to the unbalanced action of the Rhomboidei, Lev. Ang. Scapulæ, Trapezius, and Pectoralis Minor, the scapula is somewhat raised and approximated to the spine, and so rotated on its axis, that while its vertebral border is directed obliquely outwards and upwards, its inferior angle is drawn close to the spine, standing out slightly from the thoracic wall.

In consequence, the movements of the upper extremity on the affected side are considerably interfered

with, the patient experiencing considerable difficulty in raising the extended arm above the horizontal level.

The displacement of the inferior angle of the scapula in these cases must not be confounded with that met with in subscapular bursitis (387).

Paralysis of the serratus magnus, when occurring as an isolated affection, is usually due to injury of its nerve (long thoracic), which from its long and comparatively superficial course is somewhat exposed to direct violence; it may also follow exposure to cold, or be due to spinal or cerebral disease, but when appearing as the result of the latter causes, other muscles will be paralysed as well.

CHAPTER XXXIV

AFFECTIONS OF THE SCAPULA AND SCAPULAR REGION

Tumours or Swellings in Scapular Region.

386. The tumours or swellings most commonly met with in the scapular region may be arranged as follows:—

- Tumours or Swellings in Scapular Region.
  - Connected with Soft Tissues
    - Superficial to Scapula — cf Tumours of Shoulder (402).
    - Beneath Scapula
      - Subscapular Abscess (388).
      - Subscapular Bursitis (387).
  - Connected with Scapula
    - Inflammatory
      - Periostitis (394).
      - Callus after Fracture (384).
    - New Growths
      - Enchondroma (390).
      - Exostosis (391).
      - Sarcoma (392).

Subscapular Bursitis.

387. *Inflammation of the Infra-serratus Bursa, i. e.* the one often present between the inferior angle of the scapula and the chest-wall, is sometimes seen:* it usually manifests itself as a fluctuating swelling, projecting from beneath the axillary and vertebral borders of the bone, and also raising its inferior angle from the wall of the thorax, so that it is rendered unduly prominent. If the effusion is slight in amount, and the walls of the bursa are thickened and roughened from deposit of lymph, or if it contains in its interior melon-seed bodies, crepitation may be present on any movement of the arm, or upon making local pressure on the part, so that at first sight this condition might simulate a fracture of the ribs, scapula, or humerus, or chronic rheumatic arthritis of the shoulder-joint: careful examination will, however, generally readily reveal

* 'International Encycl. of Surgery,' vol. ii, p. 716.

the nature of the affection. The undue prominence of the lower angle of the scapula must also be distinguished from that which is met with in displacement of the bone from beneath the Latissimus Dorsi (**385**), and also in cases of paralysis of the Serratus Magnus (**385**). In some cases the bursa more or less completely solidifies, and then simulates a solid tumour, or it may suppurate, and in this way give rise to a Subscapular Abscess (**388**).

Subscapular Abscess.

388. *Subscapular Abscess.* — Suppuration sometimes occurs in the connective tissue between the subscapularis and serratus magnus, giving rise to the formation of a deep-seated abscess in this situation. Owing to its distance from the surface, fluctuation and the external evidences of inflammation are at first usually absent, but there is general tumefaction and the scapula is rendered unduly prominent, being raised from the chest walls and sometimes appearing to float. The pus often burrows widely, and may make its way downwards below the scapula, upwards into the neck, backwards beneath the Latissimus Dorsi, or forwards into the axilla (**424**), obliterating the hollow which is normally present: in the latter case the axillary swelling will be rendered more manifest, if pressure is made upon the scapula, or if the arm is drawn forwards.

Prominence of Scapula.

389. *Undue prominence of the Scapula* may be due to various causes, viz.:—

Subscapular Bursitis (**387**).

Subscapular Abscess (**388**).

Displacement of Scapula (**385**).

Lateral curvature of Spine (**697**).

Tumours of Scapula.

The Scapula is sometimes the seat of sarcomatous and cartilaginous growths, more rarely of exostoses.

Enchondromata.

390. *Enchondromata*, or tumours consisting of cartilage (**571**), are sometimes met with springing from the surface of the scapula: they usually present themselves as circumscribed, slowly-growing tumours, with nodular outline, and of uniformly firm consistence; in some cases they attain considerable dimensions, and, as they increase in size, generally show a tendency to undergo ossification.

Exostoses.

391. *Exostoses* are sometimes met with springing from the scapula, presenting characteristics similar to those described (**460**).

Sarcomata.

392. *Sarcomata*, either of the central or periosteal variety (**461**), not unfrequently attack the scapula; they may spring from any part of the bone, and, as they increase in size, they rapidly involve surrounding parts, so that after a time considerable difficulty is often experienced in determining the origin of the tumour: it often happens that at the time the case comes under observation, the growth has extended from the scapula to the clavicle and upper end of the humerus, involving also the soft tissues of the lower part of the neck, shoulder, and axilla.

The tumour generally has a smooth or somewhat lobulated surface, with well-defined outline, and is of firm or semi-elastic consistence, often presenting here and there a sense of obscure fluctuation.

As it increases in size, the skin covering it becomes tense and discoloured with enlargement of the subcutaneous veins, and it may subsequently ulcerate and give way. Pain may be present, but is not, as a rule, a prominent symptom. The movements of the upper extremity are more or less interfered with.

Tumours of this nature not uncommonly occur in young subjects about the age of puberty, and they

frequently follow some injury, viz. a blow or fall upon the shoulder.

They are of an especially malignant nature, and even if removed along with the clavicle, scapula, and upper extremity, in most cases speedily recur, either in the soft tissues about the shoulder, or in some internal organ.

Necrosis.

393. A sinus discharging pus and leading down to bare bone, which can be detected with a probe, is found in cases of *Necrosis* of the scapula. As in instances of necrosis of other flat bones (*e.g.* the ilium), the separation of the sequestrum is often a very slow process, and a considerable period often elapses before the dead portion of bone is sufficiently loose to come away of itself, or admit of removal.

Periostitis.

394. *Periostitis*, acute or chronic, may attack the scapula, giving rise to symptoms similar to those described (**445**). If suppuration, "periosteal abscess" ensues, necrosis will probably result.

Rickets.

395. In some cases of *Rickets* (**451**), thickening of the margins of the scapula is found like that occasionally met with in the case of the Cranial Bones (I. 33).

form a distinct bulging about the middle of the upper arm, which may simulate the presence of a tumour.

Dislocation of Tendon of Biceps.

401. *Dislocation of the Long Tendon of the Biceps* to the inner side of its groove in the humerus is rarely met with. When present, the head of the humerus, losing the support normally supplied by the tendon, rises slightly upwards and forwards, so that it is rendered unduly prominent in front, almost to the extent of a partial dislocation (**433**); at the same time the head of the bone is somewhat raised beneath the acromion; excessive pain is experienced on any action of the biceps muscle, and the movements of the arm are much impaired, abduction being almost entirely prevented owing to the great tuberosity of the humerus at once locking against the acromion.

Tumours about shoulder.

402. *The Tumours or Swellings* most commonly met with in connection with the soft tissues in the neighbourhood of the shoulder are as follows:—Lipomata (**404**), sebaceous cysts (**405**), fibromata or sarcomata (**403**), gummata (**406**), abscess (**408**), and hæmatoma (**425**); along with these may also be included subdeltoid (**407**) and subscapular (**387**) bursitis; anthrax (Pt. I, **267**), hydatid cysts (Pt. I, **255**), molluscum fibrosum (Pt. I, **19**).

In severe cases of lateral curvature of the spine (**617**), considerable displacement and twisting of the muscles over the spine and scapula is often present, producing an undue prominence or bulging, which may in some cases simulate the presence of a tumour.

Fibromata and Sarcomata.

403. *Fibromata and Sarcomata.* — Tumours of a fibrous or sarcomatous nature are sometimes met with springing from the subcutaneous tissue or connected with the muscles about the shoulder, perhaps most frequently with the deltoid. They present similar sym-

ptoms and run a similar course as in the case of the same growths occurring in other parts of the body, the fibromata appearing as firm, slowly-growing, lobulated tumours, circumscribed and encapsuled, and not usually tending to recur after removal; sarcomata, on the other hand, present themselves as more or less rapidly-growing tumours, in some cases firm and hard, in other cases soft and fluctuating, and containing cysts in their interior, and often tending to recur after removal, either locally or in internal parts.

Lipomata.

404. *Lipomata or Fatty Tumours* are of frequent occurrence in the neighbourhood of the shoulder, perhaps most commonly on its posterior aspect over the deltoid muscle.

They present similar characteristics to those described as occurring in the neck (Pt. I, **268**), where the main points of diagnosis between a lipoma and a sebaceous cyst are mentioned; for the diagnosis between lipoma and chronic abscess (Cf. **408**).

Sebaceous Cysts.

405. *Sebaceous Cysts* are not unfrequently met with about the shoulder; they present similar characteristics to those described, as when occurring on the scalp (Pt. I, **6**). As the result of some irritation, *i. e.* constant friction, they may inflame and suppurate, giving rise to the formation of a fungating, ulcerated surface (Cf. Fungating Sebaceous Cyst, Pt. I, **6**).

Gummata.

406. *Gummata.*—Gummatous deposits in the subcutaneous tissue are not unfrequently met with, especially on the posterior aspect of the shoulder in patients the subjects of constitutional syphilis.

They usually present themselves as small rounded tumours of moderate size, and firm consistence, unattended by much if any pain; in some cases single, in others multiple and collected into groups.

At first they are moveable, rolling under the skin, which is not altered in colour; after a time they lose their mobility, and the superjacent integument, becoming fixed and adherent, changes colour, assuming a reddish or purplish hue.

Under specific treatment the deposit may become absorbed and disappear; in other cases it gradually increases in size, and if, as so often happens, softening ensues, it becomes doughy and semi-elastic, or it may break down and suppurate. Under these circumstances fluctuation will be evident, and the swelling will present all the symptoms of a simple abscess. A gumma may remain in any of these conditions for a considerable time, or it may burst and discharge its contents, giving rise to the formation of a deep syphilitic ulcer (499).

In the early stage, before it has broken down, a gumma may be recognised by its rounded form, its firm consistence, its painless nature, its mobility, and its indolent course. The history of the case, the other symptoms of syphilis usually present, and the effects of specific treatment will also assist in diagnosis.

At times the muscles about the shoulder, *e. g.* deltoid, trapezius, &c., become the seat of gummy deposits, which run a course, and present characteristics similar to those described.

Subdeltoid Bursitis.

407. *Subdeltoid Bursitis.*—As a result of injury, *e.g.* a fall or blow upon the shoulder, inflammation of the bursa, which lies between the under surface of the deltoid muscle and the shoulder joint, is sometimes set up.

In cases where considerable effusion has taken place into its interior, the outline of the muscle is rendered unduly convex, and a distinctly fluctuating swelling will be felt on the outer aspect of the shoulder, most evident when the arm is raised and the muscle relaxed. More

or less pain will be present, increased when the muscle is put into action, and also if traction is made upon the arm and it is brought to the side, or if it is abducted beyond a right angle, for on both these movements pressure will be exerted upon the inflamed bursa.

On raising the elbow the pain will be relieved, and none is felt on pressing the joint surfaces together, as would be the case if the articulation was involved.

In cases where the inflammation is of a subacute or chronic character, and the amount of effusion is slight, a crepitating or crackling sensation is often produced on manipulating the arm, owing to the rubbing against one another of the roughened surfaces of the interior of the bursa: the same symptom is also often present in the early stage of the acute affection, before much effusion has taken place.

Under these circumstances this condition, usually following an injury, might simulate a fracture of the neck of the humerus, but the nature of the crepitation, a crackling sensation, rather than the rough grating of fracture, along with the absence of the other characteristic symptoms (abnormal mobility, deformity, &c.), will usually render the diagnosis easy.

Subdeltoid Bursitis may also at first sight simulate rheumatic arthritis of the shoulder-joint (**417**), but on careful examination little difficulty will be experienced in distinguishing between the two affections.

408. *An Abscess about the shoulder* may occur in connection with disease of the joint itself, and under these circumstances it will have been preceded and be accompanied by symptoms indicative of that condition (**412**). Abscess.

In other cases, as the result of injury or otherwise, it may form in the soft tissues, independently of any affec-

tion of the joint, commencing in some instances as an acute inflammation of one of the superficial or deep bursæ present in this situation. Under these circumstances there will be an absence of symptoms indicative of joint disease, viz. no pain on pressing the articular surfaces together; no grating on movement of the limb; no starting pains at night; no displacement or alteration in shape of the ends of the bones. The constitutional disturbance will be much less severe than in cases where the joint is involved; if the abscess is opened and its interior explored, it will be found to have no connection with the articulation.

After the abscess has been opened, or burst and discharged its contents, a sinus (**409**) may remain.

Diagnosis.

When the abscess is of small size and of a chronic nature, it is sometimes extremely difficult to distinguish it from a lipoma, or sebaceous cyst, for both these forms of tumour are of common occurrence about the shoulder, especially on its posterior aspect, and in each instance the swelling, which may be soft, elastic and well defined, not apparently involving the skin, may remain stationary for a considerable period, or very slowly increase in size.

A *Lipoma* (**404**) may usually be distinguished by attention to the following facts:—the absence of true fluctuation, though the tumour may be soft and very elastic; the lobulated outline of the tumour, which is not smooth and rounded; the dimpling of the superjacent skin, especially when it is pinched up or made tense over the swelling.

In the case of a *Sebaceous Cyst* (**405**), the superjacent skin will usually be found adherent to the tumour, so that it cannot be raised from it or made to glide over it: in some cases the orifice of the obstructed glandular

duct can be distinguished, and through it the contents of the cyst may be forced out.

409. *Sinuses* about the shoulder may be the result of the non-closure of the cavity of an abscess which has formed in connection with the soft tissues (**408**); or they may be associated with necrosis of the scapula (**393**); or upper portion of the humerus (**448**); or they may appear in connection with disease of the shoulder-joint (**412**) under the latter circumstances, the pus often burrows downwards beneath the deltoid, so that the orifices of the sinuses are frequently situated near the insertion of the muscle into the humerus on either the anterior or posterior aspect of the limb. Sinuses.

410. *Paralysis of the Deltoid* is usually the result of injury or disease affecting the nerve which supplies it (circumflex), viz.:— Paralysis of Deltoid.

1. *From Injury.*—Severe blows or contusion, involving the nerve (**398**).
   Dislocations of humerus (**432**); fracture of neck of humerus (**437**), when the nerve is ruptured, bruised, or pressed upon by the head or neck of the bone.
   Implication of the nerve in callus after fracture of the neck of the humerus (**437**).
   Rupture of the brachial plexus (**647**).
2. *From Disease.*— Progressive muscular atrophy (**653**).
   Infantile paralysis (**649**).
   Central paralysis of all kinds; lead paralysis (**650**).

In paralysis of the muscle, the arm hangs helplessly by the side and cannot be raised from the chest walls. The muscle itself is relaxed and flaccid, and atrophy (**411**) very soon results.

Atrophy of Deltoid.

411. *Atrophy of the Deltoid* may be produced by any of those causes which give rise to paralysis (**410**); it may also occur from long-continued disuse from any cause, *e.g.* inflammation or disease of the shoulder-joint; injuries about the shoulder, when the arm is kept fixed and immoveable for a considerable period, &c. When the wasting is extreme, the structures about the joint often become so relaxed that a distinct groove can be felt through the atrophied muscle between the head of the humerus and the margin of the glenoid cavity.

Owing to the flattening of the shoulder which is produced, and the apparent prominence of the acromion with a hollow beneath it, the appearance may at first sight simulate a dislocation of the humerus (**430**), and in some cases a partial displacement may result, the head of the bone being drawn forward on to the lower margin of the glenoid cavity by the unbalanced action of the pectoralis major (**433**).

CHAPTER XXXVI

AFFECTIONS OF THE SHOULDER-JOINT

Disease of Shoulder-joint.

412. As compared with the other large articulations of the body, disease of the shoulder-joint is of extremely rare occurrence, the result, no doubt, of its much greater simplicity of construction, the protection it receives from its thick covering of soft tissues, and the mobility of the scapula, which yields to violence. As in the other joints, disease may commence in the synovial membrane or in the articular portions of the bones entering into its formation, most commonly in the head or upper epiphysis of the humerus. In other instances it may originate in the soft tissues round about, involving the joint secondarily.

Synovitis.

413. *Synovitis.*—Inflammation of the synovial membrane, in all its different forms—acute, subacute, or chronic—may attack the shoulder-joint; it is most commonly met with as a subacute affection, the result either of injury, or in connection with acute or chronic rheumatism; it may also occur from simple exposure to cold, or in connection with syphilis, gonorrhœa, the strumous diathesis, or in cases of pyæmia.

The symptoms of synovitis, attended by effusion into the interior of the joint, are more or less swelling to be detected behind the head of the humerus below the prominent acromion, and in front, to the inner side of the head of the bone below the clavicle; in slight cases, owing to the thick covering of the deltoid, the swelling

is not very apparent; but in the later stages, if it is at all considerable, the general contour of the shoulder will be enlarged and rounded, and under these circumstances fluctuation may possibly be detected.

More or less pain will be complained of, increased on movement, or on bringing the articular surfaces into contact with each other; tenderness will be present upon pressure, the movements of the joint are impaired, and the arm is held applied to the side; if the inflammation is at all acute, there will be local elevation of temperature, though this is not usually a prominent symptom, owing to the distance at which the joint lies from the surface.

The inflammation may subside and complete recovery ensue, or the joint may be left permanently weakened; much more rarely the ends of the bones become involved, or suppuration takes place in the interior of the joint (414).

In the *Pulpy Disease*, or *gelatinous degeneration* of the synovial membrane (**471**), which does not, however, very frequently attack the shoulder-joint, at any rate as compared with some of the other large articulations, the general symptoms will be much the same at first, though pain will be less prominent, and the swelling will be more of a semi-elastic or doughy character, being due not so much to effusion into the joint as to pulpy thickening of its synovial lining. In most cases of pulpy disease the ends of the bones become subsequently involved from extension of the disease, and more or less complete disorganisation of the joint is ultimately produced.

The general course and symptoms of pulpy disease are more fully described in the case of the elbow-joint (**471**).

Articular Ostitis.

414. *Articular Ostitis*, or osteomyelitis of the head or

upper epiphysis of the humerus, is sometimes met with: here, the bone itself becomes the seat of an acute or chronic inflammation, which in many cases goes on to suppuration and destruction of its substance (caries (449) or necrosis (448)). Under these circumstances, if absorption of the head of the bone and erosion of its articular surface ensue, the joint becomes secondarily involved, and, suppuration taking place in its interior, it is finally more or less completely destroyed.

Most cases of destruction of the shoulder-joint are due primarily to this cause, *i.e.* articular ostitis of the upper end of the humerus—a condition which is usually found associated with the strumous diathesis. In other cases, though probably less frequently, the affection of the head of the bone is secondary to disease (pulpy degeneration), commencing in the synovial membrane (413).

One of the earliest symptoms of articular ostitis is pain in the joint, especially over the head of the humerus, increased on movement or upon pressing the articular surfaces together. On careful examination some enlargement of the upper extremity of the humerus will often be found to be present, the result of effusion beneath and thickening of the periosteum and fibrous tissue immediately around it; tenderness on pressure and slight local increase of temperature are also generally apparent.

If absorption of the head of the bone and erosion of the articular cartilage ensue, grating will be produced on movement, and when the absorption is considerable, shortening of the limb and spontaneous dislocation may result.

When suppuration takes place in the interior of the joint, the external evidences of inflammation become

more marked; there is increased swelling with redness and œdema of the soft tissues round about it; fluctuation becomes apparent, and the pus, making its way to the surface, either follows the course of the long tendon of the biceps, and points at the front of the arm near the insertion of the deltoid, or discharges behind the joint, or in front beneath the pectoral muscle, or in the axilla. Under these circumstances the joint becomes completely destroyed, and if recovery takes place either fibrous or osseous anchylosis (421) will result.

In some cases, as the result of "caries sicca" (*i. e.* caries of bone unattended by formation of pus), considerable absorption of the head of the humerus, leading to destruction of the joint and displacement of the end of the bone may take place without any suppuration attending the process.

Acute Epiphysitis.

415. *Acute Epiphysitis.*—In young children the soft, growing, and vascular tissue at the junction of the shaft and epiphysis of the humerus may become the seat of acute inflammation, which often rapidly runs on to suppuration. Under these circumstances separation of the head of the humerus frequently ensues, the joint becomes filled with pus, and the periosteum covering the upper portion of the shaft of the bone often becomes involved from extension of the inflammation.

The symptoms of this condition are high fever, pain, heat, and redness about the shoulder-joint and upper part of the arm, with the formation of a fluctuating swelling, soon followed by discharge of pus through one or more openings in the soft tissues.

If the abscess or the sinuses, which form after it has burst, are laid open and explored, the head of the bone will be often felt lying loose and bathed in pus in the

interior of the joint, and the upper part of the shaft of the bone will probably be found bare and denuded of periosteum.

In these cases death frequently results from septicæmia, or if a free vent is given to the discharges and the separated head of the bone is removed, recovery may ensue with a shortened and stiffened limb.

Syphilitic Epiphysitis.

416. *Syphilitic Epiphysitis.*—In infants, the subjects of congenital syphilis, usually within the first six months of life, peculiar changes of an atrophic character often occur at the junction of the shaft with the epiphyses of the long bones, which lead to arrest of ossification, and in many cases to fracture of the bone, or rather separation of the epiphysis. Accompanying these changes in the epiphysial cartilage there is usually some inflammation of the surrounding periosteum or perichondrium, in consequence of which a slight swelling often surrounds the bone at the junction of the shaft and epiphysis. If the upper extremity of the humerus is involved, the arm of the child will be observed to hang motionless by the side, as though it had been fractured or paralysed. As a rule, no external symptoms of inflammation, or only very slight ones, are apparent; the temperature of the part is not increased, and pain and tenderness are not present; in some cases slight thickening may be detected about the neck of the bone, surrounding it like a ring.

If separation of the epiphysis ensues, abnormal mobility will be present, with crepitation on any movement of the part. In most cases, under specific treatment, recovery will take place in the course of a few weeks, the arm being restored again to its normal condition; or slight shortening may result; or the epiphysis, if it has been separated, may become again

united to the shaft of the bone, but not in its proper position, so that some deformity remains.

In exceptional instances suppuration ensues, and all the symptoms of acute epiphysitis are present (**415**).

The most characteristic symptom in the early stage of the affection is the loss of power in the affected limb; this condition, which is usually termed syphilitic "*pseudo-paralysis*," is very liable to be mistaken for *infantile paralysis* (**649**), but it can usually be distinguished by attention to the following points, viz: it generally appears at a somewhat earlier period of infant life, *i.e.* within the first few weeks after birth; there is no wasting of the muscle about the shoulder, nor alteration of reaction to faradism; other evidences of congenital syphilis will be present; and in most cases the ends of several of the long bones will be simultaneously or successively involved. As the case progresses, the swelling at the junction of the shaft and the epiphysis will probably show itself, and if separation of the epiphysis takes place, grating and abnormal mobility will be present.

From *Rickets* (**451**), in which an enlargement of the ends of the long bones also occurs, syphilitic epiphysitis can usually be distinguished by the fact that in the former affection the swellings do not, as a rule, appear so early, viz. not until the patient is at least six months old; examination of the skull (Pt. 1, 32), chest (**709**), &c., the other symptoms present, and the absence of any evidence of congenital syphilis, will also assist in distinguishing between the two affections.

Rheumatic Arthritis.

417. *Rheumatic*, or *Rheumatoid Arthritis*, or *Arthritis Deformans*, are the terms applied to a form of chronic joint-disease, occurring in rheumatic subjects, and characterised by peculiar changes in the articular ends of

the bones, in the cartilages covering them, and in the surrounding soft tissues.

These changes consist in a gradual absorption of the articular ends of the bones and their investing cartilage, in consequence of which they become altered in shape, the globular head of the humerus becoming, as it were, flattened out into a mushroom-like form, and the glenoid cavity widened and enlarged.

Accompanying these changes in the interior of the joint, masses of new bone are thrown out round about, viz. round the head of the humerus and margin of the glenoid cavity, as well as in the surrounding soft tissues (capsule, ligaments, tendons, and muscles); these deposits of bone, "*Osteophytes*," as they are termed, constitute one of the most characteristic features of the disease, for by their presence they cause more or less rigidity of the joint, and by their rubbing against each other they give rise to a peculiar crackling sensation on any movement of the limb.

The early symptoms of the affection, which, according to some authorities, commences with changes in the articular cartilages,* according to others, with simple synovitis, accompanied by slight effusion into the joint, are pain in the shoulder of a dull, aching character, and affected (like other rheumatic pains) by changes in the weather, and worse at night: slight swelling may also

* "The disease very especially affects the cartilage, secondarily also the synovial membrane, as well as the periosteum and bone; in most cases the affection of the cartilages is no doubt the primary one. The changes which we meet with in the cartilage are the following: it becomes uneven at single points, then rough on the surface, and in advanced cases disappears entirely here and there, and leaves the bone exposed in places quite smooth and, as it were, polished." Lectures on 'Surgical Pathology and Therapeutics,' Billroth, New Sydenham Society, vol. ii, p. 264.

be present, but this is never a very prominent symptom. The movements of the joint are affected, more or less stiffness being usually complained of. On passive movement a slight crackling or dry crepitating sensation can usually be detected on laying the hand on the shoulder.

As the disease slowly progresses, the effusion into the joint is absorbed, and the slight swelling, which in the early stage is due to this cause, disappears.

Later on, as the articular ends of the bones become involved, other changes ensue which lead to more or less permanent deformity: deposits of new bone, or osteophytes, are gradually thrown out round the upper extremity of the humerus and margin of the glenoid cavity; at the same time absorption of the cartilage and articular surfaces takes place, so that slight displacement often results, the head of the bone appearing to be elevated and carried somewhat forward.

Rigidity becomes a more prominent symptom, and crackling on movement, owing to the rubbing of the altered articular surfaces, as well as of the osteophytes, against each other, is more marked, becoming in extreme cases so loud that it may be heard at a distance from the patient; the pain also continues of the same dull aching character. When the disease has been in existence for some time, considerable atrophy of the deltoid (411) is frequently present from disuse, and slight shortening of the limb is often found.

The disease, which in most cases resists all treatment, is a very chronic one, lasting for many years, and a peculiar feature, distinguishing it from most other forms of joint affection, is the absence of any tendency to suppuration.

Chronic rheumatic arthritis is essentially a disease of

middle or advanced life, only occurring exceptionally under thirty years of age. It may attack a single joint, as the shoulder, but in many instances other articulations are simultaneously or successively involved, and the subjects of it will often present other evidences of the rheumatic diathesis. In many instances the joint-affection appears to be excited by some injury, and is often referred by the patient to a blow or fall; in other cases it occurs spontaneously, or appears simply as the result of exposure to cold.

The main peculiarities of this affection are as follows:—

1. The chronic course and generally incurable nature of the disease, which commonly appears after middle age.
2. The absence of any tendency to suppuration.
3. The nature of the pain—"rheumatic."
4. The deformity produced, owing to the alterations in shape of the ends of the bones.
5. The rigidity of the joint.
6. The crackling produced upon movement.

For the points of distinction and resemblance between this affection and Charcot's Joint Disease, cf. **(419)**.

'Charcot's Joint Disease,' or Ataxic Arthropathy.

418. In patients suffering from locomotor ataxy, the shoulder-joint sometimes becomes the seat of a peculiar form of disease known as *Ataxic Arthropathy*, or often described as "*Charcot's Joint Disease*," after the celebrated French physician, who was the first to direct attention to it.* The first evidence of this affection, which usually shows itself very suddenly, is swelling about the shoulder-joint, due partly to effusion into its interior, partly to effusion into the soft tissues round

* 'Lectures on Diseases of the Nervous System,' by J. M. Charcot, New Sydenham Society, second series, p. 49.

about; the nature of the swelling, which is one of the characteristic symptoms in the early stage, is somewhat peculiar, inasmuch as it is usually of a hard or solid consistence, not pitting on pressure.

Other characteristic symptoms are the absence of any evidence of inflammatory action about the joint, *e.g.* there is no pain, no redness, no local increase of temperature, nor is there any general pyrexia; it is only in exceptional cases that these symptoms are present.

At the end of some weeks or months, in what is termed the "*benignant*" form of the disease, the swelling may disappear and there may be a gradual return to the normal condition.

In other cases, in the "*malignant*" variety, complete disorganisation of the joint results; in the course of a week or two after the invasion of the joint, sometimes much sooner, crackling sounds may be observed on any movement of it, showing that changes are taking place in the articular surfaces; the swelling rapidly disappears, leaving behind extreme mobility of the joint, the result partly of softening and destruction of its capsule and ligaments, partly of erosion and absorption of the articular surfaces of the head of the humerus and glenoid cavity; consequently the joint is left in an abnormally mobile and flail-like condition, and dislocation readily occurs.

These changes may occur with marvellous rapidity, the joint becoming sometimes completely destroyed in the course of a few days; "in spite of these profound lesions, the member affected by arthropathy may still serve for prehension." This peculiar affection of the joint usually manifests itself at a somewhat early period in the course of locomotor ataxy, often long before the characteristic inco-ordination of movement

of the lower extremities shows itself; in most cases, however, one or other of the following symptoms will be found to have preceded or to accompany the implication of the joints, viz. lightning pains in the limbs, girdle-pains, gastric crises, affections of the eyes, bladder symptoms, loss of tendon reflex in the knee, &c.

Examination of the joint in these cases shows atrophy and absorption of the articular ends of the bones, changes very similar to those met with in rheumatic arthritis (**417**); in some cases there may be a slight deposit of osteophytes in the neighbourhood of the joint, but this is exceptional and never present to anything like the same extent as seen in the rheumatic affection; it is owing to this fact that dislocation so often occurs, for there is no extensive peri-articular formation of bone to keep the remains of the head of the humerus in its place, as is usually the case in rheumatic arthritis. The joint affection appears to be dependent on lesions in the spinal cord, viz. implication of the anterior horns of grey matter in the sclerotic process which is characteristic of locomotor ataxy, and it is therefore an example of a "tropho-neurosis," or nutritive disorder secondary to changes in the nervous centres.

Sometimes the shafts of the long bones become the seat of changes somewhat similar to those occurring in their articular ends, for it has been observed that in certain cases of locomotor ataxy, *spontaneous fracture* very readily occurs; a peculiarity in connection with these fractures is that they appear to possess good reparative powers, for repair is usually readily effected by a more than usually exuberant production of callus.

In locomotor ataxy, therefore, "fracture of the bones and disease of the joints appears to belong to the same

pathological condition, *i. e.* when the disease attacks the diaphyses of the bones, the atrophy is proved by fracture; when it attacks the joints, we get the wasting of the head of the bone with erosion of the surface."

In the following tables the main points of resemblance and of distinction between Charcot's joint disease and rheumatic arthritis (**417**) are mentioned.

Diagnosis of Rheumatic Arthritis and Charcot's Joint Disease.

419. *Points of resemblance.*—In both affections there may be,

1. Effusion into the joint in the early stage.
2. Extensive absorption of the articular surface of the bone.
3. Spontaneous dislocation.
4. Crepitation on movement.
5. Deposit of osteophytes round the joint.
6. Absence of any tendency to suppuration.
7. In both affections, the disease does not usually show itself until after middle age.

Points of distinction.—The two affections differ from one another in the following points:—

	Rheumatic Arthritis.	Charcot's Joint Disease.
Course	Often excited by an injury.	Always appears spontaneously.
Premonitory symptoms	Of chronic rheumatism.	Of locomotor ataxy.
First symptoms	Show themselves gradually.	Appear suddenly.
Effusion into joint in early stage	Very slight, or altogether absent.	Abundant.
Effusion round joint	Absent.	Abundant.
Swelling about joint in early stage	Absent, or only present to very slight extent.	A prominent symptom.
Deposit of osteophytes	Usually abundant.	Usually absent, or only present to slight extent.
Mobility of joint	Usually diminished; joint rigid.	Usually increased; joint flail-like.
Dislocation	Rare.	Very common.
Pain	Always present; 'rheumatic.'	Usually absent.
Inflammatory symptoms	Slight; may be present in early stage, and from time to time.	Usually absent.
Course of disease	Very slow and steadily progressive.	Very rapid.
Prognosis	Usually incurable.	Benignant form curable; malignant form incurable.

420. *Atrophy or absorption of the head of the humerus,* leading to more or less deformity of the shoulder, *e. g.* dislocation of the humerus, partial or complete (**433**) with shortening of the limb, may be due to any of the following causes: Absorption of Head of Humerus.

Injuries or disease of the circumflex nerve (**640**).

Epiphysitis (**415**), or ostitis (**414**) of the upper extremity of the humerus.

Intra-capsular fracture of the neck of the humerus (**437**).

Chronic rheumatic arthritis (**417**).

Charcot's joint disease (**418**).

Anchylosis.

421. *Anchylosis or stiffness* of the shoulder-joint may be due to changes occurring within or without the joint; hence two different varieties are met with, viz. intra- and extra-articular anchylosis.

When the anchylosis is due to the intervention of fibrous bands between the articular surfaces, or to fibrous thickenings and adhesions in the tissues outside the joint, it is described as fibrous, false, or incomplete anchylosis, a certain amount of movement being present in the joint.

When, on the other hand, the articular surfaces are firmly united together by osseous tissue it is described as osseous, true, or complete anchylosis, all movement being entirely lost.

These conditions are usually the result of inflammatory changes occurring either within or without the joint, symptoms of which will previously have been present.

1. Intra-articular.

Intra-articular anchylosis may be either of the fibrous or osseous variety; it will always have been preceded by a history or evidence of inflammation within the joint.

Fibrous.

In the *fibrous* or *false* variety, the ends of the bones are united by bands of fibrous tissue, which pass across the joint from one articular surface to the other; it is always preceded by destructive changes in the joint itself, viz. ulceration of cartilage and more or less absorption of the articular surfaces. If repair takes place, granulations spring up from the opposed surfaces, and, these coalescing with one another, eventually develop into bands of fibrous tissue, which stretch across the joint. Under these circumstances a certain amount of

Anchylosis.

movement is possible in the joint, the anchylosis being incomplete.

b. Osseous.

In the *osseous* or *true* variety, the ends of the bones are firmly united and blended together by bony tissue. This is simply a more advanced degree of the preceding variety, ossification having taken place in the fibrous tissue, and all trace of the articular cartilages having entirely disappeared.

In this form all movement is lost in the joint itself, but in the case of the shoulder, owing to the mobility of the scapula upon the trunk, the arm can still be moved very freely, so that in many instances a tolerably useful limb nevertheless results.

2. Extra-articular.

Extra-articular anchylosis may, again, be of two kinds.

a. Fibrous.

In the *fibrous* or *false* variety, the stiffness is due to fibrous adhesions, contractions, and thickenings in the soft tissues round the joint, *e. g.* in the capsule, ligaments, tendons, muscles, &c., such as is often produced in joints which have been kept at rest for a considerable length of time from any cause, *e. g.* on account of inflammation in or around the joint, dislocation, fracture, sprain, contusion, &c., about the shoulder.

In these cases a certain amount of movement is possible in the joint.

b. Osseous.

In the *osseous* variety, which is seen in cases of rheumatic arthritis, movement is prevented by the presence of osteophytes, which develop round the articular surfaces, and also in the surrounding soft tissues (**417**).

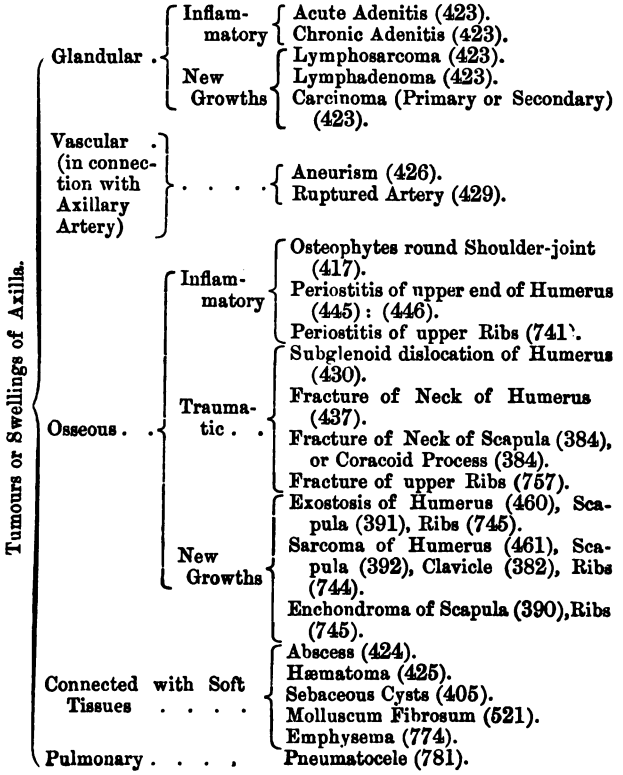
In these cases movement, which is more or less limited, is attended by loud crackling, owing to the rubbing together of the roughened masses of bone.

CHAPTER XXXVII

AFFECTIONS OF THE AXILLA

Tumours and Swellings of Axilla.

422. In the following table the tumours or swellings commonly met with in the region of the axilla are mentioned:



423. *Enlargement or Swelling of the Lymphatic Glands* of the axilla may be due to simple inflammatory causes, as in the case of simple adenitis, acute or chronic, or it may be of a malignant nature, and due to the presence of new growths, as in the case of sarcoma or carcinoma attacking these structures. Affections of Lymphatic Glands.

Acute or Subacute Adenitis, or inflammation of the glands of the axilla, may occur without any assignable cause, or as the result of a severe strain or twist of the arm; in most cases, however, some perceptible source of irritation will be found in the parts where the lymphatic vessels, which pour their contents into the axillary glands, commence, *e. g.* on the hand or arm, breast, thorax, back, or shoulder, or upper part of abdomen, as low down as the umbilicus. 1. Inflammatory. *a.* Acute Adenitis.

The affected gland or glands, which may be situated in the centre of the space or along the anterior, posterior, inner, or outer walls of the axilla, will become more or less tender, painful, enlarged, and perceptible beneath the skin. At first they are distinct and freely moveable, but subsequently, as the surrounding tissues become involved from extension of inflammation, they may coalesce and become fused together. Under proper treament, or if the cause of irritation, when one is present, is removed, the inflammation may subside at this stage, or it may go on to suppuration and the formation of an abscess (**424**). Under these circumstances the swelling becomes soft and fluctuating, and the external evidences of inflammation become more apparent.

Chronic Adenitis may be due to any of the same causes, or it may occur as an independent affection, often in children, or young subjects of a strumous or weakly constitution. *b.* Chronic Adenitis.

which it usually occurs, by the character of the pain which is always more severe, and also by the difference in the nature of the glandular enlargement.

Axillary Abscess.

424. *Abscess* is often met with in the region of the axilla; it may be either acute or chronic, and may occur in one of two situations, *i. e.* either superficial to or beneath the deep fascia which forms the floor of the space.

1. Superficial.

A *superficial* abscess, viz. one situated in the subcutaneous tissue, superficial to the deep fascia, presents itself as a soft, fluctuating swelling, preceded or accompanied by more or less evident signs of inflammatory action, *i.e.* pain, heat, and redness of the integument, according as the inflammation which gives rise to it is of an acute or chronic character. When appearing in this situation, a superficial abscess is frequently the result of inflammation and suppuration of a sebaceous gland.

2. Deep.

A *deep-seated* abscess, or *axillary abscess proper*, viz. one situated in the areolar tissue of the axilla beneath the deep fascia, may be *primary, i.e.* due to local causes; or, it may be *secondary, i.e.* dependent upon disease in other parts, the pus making its way into the axilla and coming from a distance.

a. Primary.

Primary Abscess may be dependent upon various causes, *e.g.*

1. Suppuration occurring in the cellular tissue of the axilla, the result of injury, or appearing without any apparent cause, simply in connection with a low state of health.

2. Inflammation of the axillary glands (**423**).

3. Caries or necrosis of the ribs forming the inner wall of the space (**742**).

4. Suppuration of an axillary aneurism (**427**), or a hæmatoma (**425**).

b. Secondary.

Secondary Abscess may also be dependent upon various causes, viz.:

1. A cervical abscess (Pt. I, 256) (connected with caries of the cervical vertebræ, suppuration of cervical glands, &c.) pointing in the axilla, the pus burrowing downwards beneath the clavicle along the brachial plexus.
2. Subscapular abscess (388).
3. Subpectoral abscess (727).
4. Disease of shoulder joint (suppurative synovitis) (413, 414).
5. Empyema (780).

The *symptoms* will vary according as the abscess is acute or chronic, primary or secondary.

When *acute and primary*, a painful, ill-defined swelling will appear in the axilla, obliterating more or less completely the hollow which is normally present; tenderness will be complained of upon pressure or on any movement of the arm, which cannot be brought closely to the side nor raised from it. There is often very little redness or heat of the superjacent integuments, which may simply appear somewhat œdematous, and owing to the pus being bound down by the deep fascia, fluctuation is often absent or very indistinct; for the same reason, the matter cannot readily point and make its way to the surface.

If left to itself the pus may burrow widely backwards or forwards beneath the subscapular or pectoral muscles, or downwards along the arm, or upwards beneath the clavicle; or, perforating the fascia, it may make its way through the floor of the axilla and discharge externally; under these circumstances, the pointing of the abscess will be preceded by evident signs of external inflammation, and, fluctuation will be evident as it approaches the surface.

When due to caries of the ribs, suppuration of an axillary aneurism or a hæmatoma, evidences of the presence of these conditions will have preceded the formation of the abscess.

In many cases, the formation of pus will be attended by rigors, and more or less constitutional disturbance will usually be present.

When of a *chronic* nature, suppuration may occur without any pain or other evidence of inflammatory action, and the first indication of its presence may be the appearance of a large, fluctuating swelling obliterating the hollow of the axilla and causing the patient remarkably little discomfort.

When *secondary*, its formation will have been preceded by evidence of disease, not in the axilla itself, but in some other part (Cf. above); pressure on the swelling will probably diminish its size or cause it more or less completely to disappear, *e. g.* in cases of empyema, the pus may be pressed back into the thorax; when secondary to a cervical abscess, the pus can be pressed back into the neck. On the other hand, pressure upon the part from which the pus proceeds will often render the swelling in the axilla more tense and prominent, *e. g.* in subscapular abscess, pressure upon the scapula, in cases of subpectoral abscess, pressure over the pectoral muscle, will often increase the swelling in the axilla.

Hæmatoma.

425. A *Hæmatoma* or *blood-cyst* may form in the loose areolar tissue of the axilla as the result of injury, *e. g.* a punctured wound, blow, or severe strain of the parts; or it may follow an attempt to reduce a dislocation of the shoulder, owing to the rupture of some of the smaller blood vessels.

It will present itself as a fluctuating swelling, appear-

ing shortly after the receipt of the injury, in some cases circumscribed and well-defined, the effused blood becoming enclosed in a distinct cavity, the walls of which are formed by fibrin and lymph deposited in the surrounding tissues.

In other cases, when coming from a large vessel (Cf. Ruptured Artery (**429**) the blood is usually more dispersed and tends to become extravasated throughout the axilla.

A hæmatoma, or collection of blood, may remain encysted in a fluid state for a considerable period; or it may gradually become absorbed; or, the fluid part becoming absorbed, a firm, hard swelling, consisting of a deposit of fibrin, may remain behind; or it may break down and suppurate, giving rise to the formation of an abscess (**424**).

Diagnosis.—In many cases it may be extremely difficult to distinguish between a hæmatoma and an abscess, but the history of the case, the rapid appearance of the swelling after the receipt of an injury, the absence of any inflammatory symptoms before its appearance, and in many instances the presence of an ecchymosed condition of the superjacent integuments, will usually assist in diagnosing the nature of the affection.

Axillary Aneurism.

426. *An Aneurism of the Axillary Artery* usually presents itself as a more or less well-defined, compressible tumour, with distinct expansile pulsation and well-marked bruit, perceptible when the ear is applied to it. Compression of the vessel above (viz. 3rd part of subclavian) arrests both pulsation and bruit, and at the same time the tumour becomes softer and decreased in size; on withdrawing the pressure, the tumour re-fills in a certain number of beats. From pressure on the branches of the brachial plexus, pain and numbness in

the arm are often present, while from compression of the axillary vein, the upper extremity is frequently swollen and œdematous. In most cases the pulse in the brachial artery and at the wrist will be much weakened or quite imperceptible.

When involving the upper portion of the vessel, the swelling will be evident just below the clavicle, and in many instances this bone will be displaced considerably upwards and forwards.

When situated lower down, the anterior and posterior folds of the axilla will be rendered unduly prominent and bulging, and the tumour will also project downward through the floor of the axilla, so that the hollow normally present will more or less completely disappear.

When of considerable size, the shoulder may be raised and rendered unduly prominent, and the arm displaced from the side; as the result of pressure, caries and absorption of the upper end of the humerus and upper ribs is sometimes produced.

If left to itself an axillary aneurism usually tends to enlarge, in some cases with great rapidity, owing to the slight resistance opposed by the loose connective tissue in this situation, and in many instances, rupture of the sac taking place, the aneurism becomes diffused (**428**).

Diagnosis.—The principal affections with which an axillary aneurism is liable to be confounded, are glandular or other tumours, abscess, and angio-sarcomata of the upper end of the humerus.

For the main points of distinction between aneurism and abscess or other tumours, Cf. Pt. I, p. 154.

In the cases of *Angio-sarcoma*, or *Osteo-aneurism* (**461**) of the upper end of the humerus, the first appearance of the swelling usually on the posterior or outer

aspect of the shoulder, and not in the axilla in the course of the vessel; its firm and more or less incompressible character; the absence of a distinct bruit, or, at most, a very faint one; the slight degree of expansile pulsation in comparison to the size of the tumour; the evident enlargement or expansion of the bone itself, with, in some cases, the presence of egg-shell crackling on pressure; the absence of any very perceptible diminution in the size of the swelling on compressing the subclavian artery—will in most cases serve to distinguish this affection from an aneurism of the axillary artery.

Suppurating Aneurism.

427. *Suppurating Axillary Aneurism.*—In some cases as the result of injury, or when the tumour has rapidly increased in size and tends to become diffused, an axillary aneurism may become inflamed, and suppuration with sloughing of the sac ensue. Under these circumstances the soft tissues round the tumour become hot, red, painful, and swollen, and, as suppuration takes place, the symptoms indicative of the formation of an abscess show themselves.

If the abscess is opened or bursts externally, there will be a discharge of sanious pus mixed with masses of broken-down coagula: under these circumstances the evacuation of the contents of the tumour may be followed by profuse hæmorrhage, which is often fatal; or a spontaneous cure may result, owing to the communication between the aneurism and the artery being plugged by masses of blood-clot, and its cavity becoming gradually filled up by the growth of granulations.

Suppuration of the sac of an axillary aneurism is sometimes seen after ligature of the 3rd part of the subclavian artery, the solidification of the contents of the tumour being occasionally followed by inflammatory

changes in the surrounding loose connective tissue, which rapidly run on to suppuration.

Ruptured Aneurism.

428. *Ruptured or Diffused Axillary Aneurism.*—Rupture of an axillary aneurism may take place as the result of inflammatory changes leading to suppuration and sloughing of its sac; or it may occur suddenly from the simple giving way of all its coats, in some cases spontaneously, in other cases as the result of a sudden strain or blow. In the former case the tumour usually bursts externally, its rupture being preceded by evidences of inflammation in the parts around it; under these circumstances hæmorrhage of a serious nature will often ensue, unless the communication with the vessel is blocked by a mass of coagulum.

In the latter case, viz. where rupture takes place suddenly and independently of inflammatory changes, the aneurism usually bursts subcutaneously; under these circumstances the symptoms will be as follows:—

The swelling loses its defined shape and becomes diffused throughout the axilla and along the arm, gradually increasing in extent; pulsation, though much less distinct, is present at first over the whole of the swelling, but gradually becomes fainter, and at length disappears altogether; a bruit can usually be distinguished as long as any pulsation is present; the arm and forearm become swollen and œdematous, and their temperature is distinctly lowered; pulsation is absent in the vessels below, *i.e.* in the brachial, radial, and ulnar arteries; the skin over the tumour becomes discoloured from infiltration with blood; considerable pain is usually present, or a sensation of numbness, from pressure on the large nerve trunks in the neighbourhood of the tumour. If left, gangrene (**506**) will probably soon show itself in the part below the swelling.

429. *Rupture of the Axillary Artery* may occur as the result of a sudden or violent strain of the arm; in some cases it may follow attempts to reduce old dislocations of the humerus, when great force has been employed. Rupture of Axillary Artery.

If the rupture is *incomplete*, involving only the middle and inner coats of the vessel, a traumatic aneurism (**428**) may form, the external coat giving way under the force of the blood-stream, and yielding so as to form the sac of the tumour. In other instances the ruptured inner coats, becoming inverted into the interior of the vessel, act like a valve, and completely block the passage of the blood along it: under these circumstances no extravasation of blood will take place, but there will be an absence of pulsation in the vessels below the point of obstruction: at the same time the temperature of the limb will rapidly fall, and unless the collateral circulation becomes speedily established, gangrene (**506**) will probably ensue.

If *complete* rupture of the vessel takes place, extravasation of blood will rapidly ensue, filling up the hollow of the axilla, extending along the arm, beneath the pectoral muscles, and around the shoulder; the skin over the swelling, which is usually more or less soft and fluctuating, soon becomes discoloured; the circulation in the limb becoming arrested, there is absence of pulsation in the vessels of the arm and forearm, which soon become swollen and œdematous; the temperature of the limb falls, and sooner or later gangrene of the moist variety appears (**506**).

CHAPTER XXXVIII

DISLOCATIONS OF SHOULDER (HUMERUS)

Dislocations of Humerus { Subcoracoid. Subglenoid. Subspinous. Subclavicular.

Dislocation of Humerus.

430. *Dislocation of the Humerus* is of extremely common occurrence. This is no doubt owing to the peculiar structure of the shoulder-joint, *e.g.* the shallowness of the glenoid cavity; the large size and globular form of the head of the humerus; the weakness of its ligaments.

The extensive movements to which the joint is subjected, and its frequent exposure to external injury, also contribute to the production of dislocation; and it would probably occur much more frequently than it does were it not for the free mobility of the scapula, which, by enabling all movements communicated to the hand and arm to re-act upon that bone, has a somewhat counterbalancing effect.

Dislocation of the shoulder may be produced as the result of direct violence applied to the shoulder, or from falls upon the hand or elbow.

Four different varieties of dislocation are described; they are mentioned in the order of their frequency of occurrence:—

1. *Sub-coracoid.*—When the head of the bone rests on the anterior margin of the glenoid cavity beneath the coracoid process.

2. *Sub-glenoid.*—When the head of the bone rests on the inferior costa of the scapula beneath the glenoid cavity.

3. *Sub-spinous.*—When the head of the bone rests on the dorsum of the scapula below its spine.

4. *Sub-clavicular.*—When the head of the bone rests on the second and third ribs on the inner side of the coracoid process and below the clavicle.

A fifth variety, the *Supra-coracoid,* is sometimes described, but is of extremely rare occurrence; it is usually associated with fracture of the coracoid process, the head of the humerus being thrown upwards and forwards on to the fractured portion of bone.

Symptoms.—The symptoms of dislocation will vary with the position of the head of the bone; the following are, however, common to all the different varieties:—

1. Flattening of the shoulder, with a hollow beneath the acromion and apparent projection of this portion of bone.

2. Presence of the head of the bone in an abnormal situation.

3. Alteration in the axis of the humerus.

4. Rigidity, swelling, and pain about the shoulder.

Diagnosis.—In the diagnosis of dislocation of the humerus, one or other of the following tests will often be found extremely useful:—

1. *Callaway's Test.*—In all the different varieties of dislocation, measurement of the vertical circumference of the shoulder, by carrying a tape over the acromion and under the axilla, gives an increase of one to two inches over the sound side.

2. *Dugas' Test.*—In dislocation the patient is unable to press the elbow to the side of the chest at the same

time that the hand of the injured arm rests upon the opposite shoulder.

3. *Hamilton's Ruler Test.*—In dislocation a piece of flat board or a ruler can be made to touch the acromion process, and external condyle of the humerus, on the injured side simultaneously, a condition which cannot exist in the normal position, owing to the projection caused by the upper extremity of the humerus.

4. *Range of Movement Test.*—In dislocation the range of movement of the injured arm is much impaired, so that it is impossible to bring the hand to the back of the head.

In the following table the main points of distinction between the different varieties of dislocation are mentioned:—

431. *Table of Dislocations of Shoulder-joint.*

	Subcoracoid.	*Subglenoid.*	*Subspinous.*	*Subclavicular.*
Appearance of Shoulder	Flattened, especially behind.	Flattened generally.	Flattened, especially in front.	Flattened, especially behind.
Projection of Acromion	Well-marked.	Well-marked; more so than in Subcoracoid.	Well-marked.	Well marked.
Depression beneath Clavicle	Replaced by a projection, viz. Head of Humerus.	Preserved.	Preserved.	Replaced by a projection, viz. Head of Humerus.
Position of Head of Humerus	Beneath Coracoid Process.	In the Axilla, beneath Glenoid Cavity.	On Dorsum of Scapula, beneath spine.	Beneath Clavicle, on inner side of Coracoid Process
Length of Arm	May be unaltered, or increased, or diminished.*	Increased.	Unaltered, or slightly increased.	Usually diminished
Anterior Fold of Axilla	Fuller than usual.	Deeper than usual.	Marked by a depression.	Fuller than usual.
Position of Elbow	Separated from Body and directed slightly backwards.	Separated from Body, more so than in Subcoracoid, and directed slightly backwards.	Directed forwards, the arm resting against the side and lying across the Chest.	Directed backwards and away from Body.
Axis of the Humerus (From below upwards.)	Directed forwards and inwards, to a point internal and anterior to the Glenoid Cavity.	Directed downwards and slightly forwards, to a point below the Glenoid Cavity.	Directed backwards.	Directed forwards, and more inwards than in Subcoracoid.

* "In 44 cases of Subcoracoid dislocation the arm was elongated in 19, unaltered in 8, and shortened in 17," 'Holmes' System of Surgery,' 3rd edit., vol. i, p. 975.

Complications.

432. *Complications.*—In exceptional cases a dislocation of the humerus may be compound, *i. e.* there may be an open wound leading down to the articular surfaces, or a laceration of the soft tissues through which the head of the bone projects, or it may be accompanied by fracture of the neck, shaft, or great tuberosity of the humerus, or of the coracoid process or glenoid cavity; or it may be complicated with rupture of the axillary artery and followed by extravasation of blood in the axilla (**429**).

In cases where the circumflex nerve is injured, paralysis (**410**) and atrophy (**411**) of the deltoid may result.

In many instances, more especially in the subglenoid form, pain, numbness, and œdema of the arm are present from pressure on the axillary vein and branches of the brachial plexus.

Partial Dislocation.

433. *Partial Dislocation.*—The term, partial dislocation, is applied to a condition of somewhat doubtful occurrence, in which the head of the humerus, without completely leaving the glenoid cavity, is thrown somewhat upwards and forwards beneath the coracoid process. This accident can probably only happen in cases where fracture of the coracoid process (**384**) or great tuberosity (**437**) has occurred, or the tendon of the biceps has ruptured (**400**), or become displaced from its groove (**401**).

As a result of disease, partial dislocation or subluxation of the humerus is not very uncommon, *e. g.* in chronic rheumatic arthritis (**417**), Charcot's joint disease (**418**), caries, necrosis (**414**), &c., when absorption of the head of the humerus or of the margin of the glenoid cavity has occurred.

It is also seen in cases of paralysis of the deltoid when, owing to the relaxed condition of the muscle and

the unbalanced action of the pectoralis major, the head of the humerus is drawn slightly forwards on to the inner margin of the glenoid cavity.

434. *Congenital Dislocations* of the humerus are of extremely rare occurrence. In these cases the glenoid cavity becomes more or less completely obliterated, a new socket being formed for the head of the humerus, which is small and misshapen, either on the anterior or posterior margin of the neck of the scapula. Congenital Dislocation.

435. *Unreduced Dislocations.*—In cases where a dislocation has been overlooked or neglected, the head of the humerus will form for itself a new joint on the surface on which it lies; the glenoid cavity becomes more or less completely filled up by inflammatory products; the head of the bone becomes altered in shape and gradually surrounded by what serves as a new capsule, formed from the surrounding soft tissues; the ruptured muscles, tendons, and ligaments form new attachments, and after a time considerable mobility may be obtained in the new or false joint formed in this way. Unreduced Dislocation.

Owing also to the free movement of the scapula upon the walls of the chest, which becomes much increased, a very useful limb will in many cases eventually result.

CHAPTER XXXIX

FRACTURES OF HUMERUS

- Fractures of Humerus
  - Upper Extremity
    - Anatomical Neck.
    - Surgical Neck.
    - Separation of Great Tuberosity.
    - Separation of Upper Epiphysis.
  - Shaft
    - Above insertion of Deltoid.
    - Below insertion of Deltoid.
  - Lower Extremity
    - Transverse Supra-condyloid.
    - T-shaped into Joint.
    - Separation of either Condyle.
    - Separation of Lower Epiphysis.

Fracture of Humerus.

436. FRACTURES of the humerus may be arranged as in the above table.

Upper Extremity.

437. *Upper Extremity.* — Fractures involving the upper extremity of the humerus are usually produced by direct violence, *e.g.* a blow or fall upon the shoulder; much less frequently they follow falls upon the hand or elbow.

1. Anatomical Neck.

1. *Anatomical Neck.* — Fracture through the anatomical neck, *i.e.* above the tuberosities and within the capsule of the joint, is not of common occurrence. The broken bones may be impacted or non-impacted.

a. Impacted.

a. In the *impacted* form, the upper fragment is usually driven into the lower one.

Symptoms. — The axis of the humerus is altered, being directed somewhat inwards towards the coracoid process, and the elbow being slightly separated from the side; the arm is shortened; the shoulder somewhat flattened; the acromion is prominent and there is a

slight depression beneath it; the head of the bone can be felt in the glenoid cavity, and in many instances some alteration in its shape can be detected; crepitus is altogether absent, or only present to a slight extent, when the arm is forcibly rotated. There is loss of motion in the shoulder, which is stiff, painful, and often swollen.

b. Non-impacted.

b. In the *non-impacted* form, less deformity is generally present; a slight projection can be felt on the inner aspect of the joint caused by the upper end of the lower fragment; crepitus is readily produced on raising and rotating the arm, which is slightly shortened; loss of power of motion, abnormal mobility, pain, and swelling about the shoulder are also present. It might be expected that under these circumstances, the head of the bone being severed from all its connections, and thereby deprived of its vascular supply, would necrose and act as a foreign body in the joint, but this result, very rarely, if ever takes place, ligamentous or even osseous union being usually effected. This is probably owing to the fact that its separation is not usually complete, consequently its vitality is maintained through the medium of portions of the capsule which remain attached to it; when osseous union results, the callus is mainly thrown out by the lower fragment; when the union is merely ligamentous, considerable absorption or atrophy of the head of the humerus is often produced.

2. Surgical Neck.

2. *Surgical Neck.*—Fracture through the surgical neck is the form most commonly met with about the upper end of the humerus. The bone is usually broken below the tuberosities and above the insertion of the Pect. Major and Lat. Dorsi.

The fracture may be either impacted or non-impacted.

a. Non-impacted.

a. In the *non-impacted* form, there is considerable displacement of the fragments.

The upper fragment is rotated outwards and slightly elevated under the coraco-acromial ligament, by the muscles attached to the two tuberosities (Supra- and Infra-spinatus, Teres Minor, and Subscapularis).

The lower fragment is drawn forwards, upwards, and inwards beneath the coracoid process by the muscles passing from the trunk to the arm (Pect. Major, Lat. Dorsi, and Teres Major), and by the flexors of the arm (Coraco-brachialis and Biceps); at the same time, the lower portion of the shaft is thrown obliquely outwards from the side by the Deltoid.

Symptoms.—The lower fragment forms a distinct prominence beneath the coracoid process (especially when the elbow is raised), which is always very characteristic; the head of the bone can be felt in its natural position in the glenoid cavity, consequently there is no hollow immediately below the acromion, though a slight depression is often present at a little distance from it, viz. just below the fractured end of the upper fragment; the axis of the limb is altered, being directed upwards and inwards towards the coracoid process.

If the limb is extended and at the same time rotated, distinct crepitus can be obtained; shortening of the limb is present, along with abnormal mobility of the shaft of the humerus.

Owing to irritation of the branches of the brachial plexus by the lower fragment, considerable pain is often present, shooting down the arm.

b. Impacted.

b. In the *impacted* form, contrary to what usually takes place in fracture through the anatomical neck, the lower fragment is generally driven into the upper.

The symptoms are chiefly of a negative kind, the usual signs of fracture being absent; there is simply slight shortening with impaired movement, deformity, and alteration in the axis of the limb; crepitus is entirely absent or only present on breaking down the impaction, *e. g.* on forcibly rotating the arm while the head of the bone is fixed.

Complication of fracture of the neck of humerus.—Owing to the close relationship of the circumflex nerve to the neck of the humerus, this structure is liable to be wounded at the time of injury, or it may subsequently become included in the callus by which repair is effected; under these circumstances, paralysis (**410**) or atrophy (**411**) of the deltoid is very liable to occur.

3. Separation of Great Tuberosity.

3. *Separation of Great Tuberosity.*—This injury may occur alone or in connection with dislocation of the head of the humerus forwards; under these circumstances, the detached portion of bone is drawn backwards, under or external to the acromion process by the muscles attached to it (Supra- and Infra-spinatus, and Teres Minor).

At the same time, the head of the humerus is drawn forward, so that it lies upon the inner margin of the glenoid cavity below the coracoid process, becoming more or less completely dislocated.

The symptoms of the injury are well marked; there is a remarkable increase in the breadth of the shoulder; a distinct prominence formed by the great tuberosity can be felt at the outer and back part of the joint, while between this and the head of the bone, which is plainly perceptible beneath the coracoid process, a distinct gap or vertical sulcus is evident; crepitus is absent unless the two fragments are brought into apposition and the arm is at the same time rotated.

4 Separation of Upper Epiphysis.

4. *Separation of Upper Epiphysis.*—In young subjects under twenty-one years of age, separation of the upper epiphysis of the humerus, which includes the head and both tuberosities, is sometimes met with; occurring, as it does, at almost exactly the same point as fracture through the surgical neck, the symptoms of the two accidents are almost precisely similar.

There is the same displacement of both fragments, but the two injuries differ in the following particulars: in fracture, the upper fragment presents a sharp and somewhat irregular outline; in separation of the epiphysis, the end of the bone is smooth, rounded, and slightly convex; crepitation is either absent or a much less prominent symptom in the latter injury owing to the fact that the line of separation runs through cartilage and not through osseous tissue.

Diagnosis of Dislocation and Fracture of Humerus.

438. In the following tables the main points of resemblance and of distinction between the commonest varieties of Dislocation (*i. e.* subcoracoid) and Fracture (*i. e.* through surgical neck of humerus) about the shoulder-joint are mentioned.

Points of resemblance.—The two injuries resemble one another in the following particulars:—

1. They may be caused by similar injuries, *e. g.* blows or falls upon the shoulder or elbow.

2. There is a prominence below the coracoid process.

3. There is a depression below the acromion.

4. There is an alteration in the axis of the humerus, viz. it is directed forwards, upwards and inwards towards the coracoid process, and the elbow is separated from the side.

5. There is loss of power in the upper extremity, with pain and swelling about the shoulder-joint.

Points of distinction.—The two injuries differ from one another in the following particulars:—

	Subcoracoid Dislocation.	*Fracture of Surgical Neck of Humerus* (Non-impacted).
Crepitus.	Absent.	Present, on extending and rotating arm.
Mobility.	Diminished.	Increased to abnormal extent.
Shortening of Arm.	Absent, or present to slight extent; the arm may be lengthened.	Present.
Deformity.	Reduced with difficulty, but when once reduced does not reappear.	Easily reduced on extending arm, but returns at once when extension is discontinued.
Head of Bone.	Absent from Glenoid Cavity, beneath Coracoid Process; rotates with shaft.	Remains in Glenoid Cavity; does not rotate with Shaft.
Projection beneath Coracoid	Smooth, rounded, and globular; formed by Head of Bone.	Sharp and irregular; formed by lower fragment.
Flattening of Shoulder.	Marked symptom.	Very slight.
Projection of Acromion.	Well marked.	Very slight.
Depression beneath Acromion	Well marked.	Absent, though there may be a slight depression at a little distance below; viz. at the seat of fracture, just below the lower end of the upper fragment.
Elbow.	Cannot be approximated to side.	Can be approximated to side.

439. *Fracture through the Shaft of the Humerus* is of common occurrence as the result either of direct or indirect violence. The common situation is about the middle of the bone, and the symptoms will vary according as the fracture takes place above or below the insertion of the deltoid. Shaft.

4 Separation of Upper Epiphysis.

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Points of resemblance.—The two injuries resemble one another in the following particulars:—

1. They may be caused by similar injuries, *e. g.* blows or falls upon the shoulder or elbow.

2. There is a prominence below the coracoid process.

3. There is a depression below the acromion.

4. There is an alteration in the axis of the humerus, viz. it is directed forwards, upwards and inwards towards the coracoid process, and the elbow is separated from the side.

5. There is loss of power in the upper
pain and swelling about the

1. Above insertion of Deltoid.

1. *Above insertion of Deltoid.*—The upper fragment is drawn inwards by the pect. major, lat. dorsi, and teres major; the lower fragment is drawn upwards by the biceps, coraco-brachialis, and triceps, and outwards by the deltoid, consequently considerable shortening is produced with deformity, the lower fragment being drawn above, behind, and to the outer side of the upper fragment.

2. Below insertion of Deltoid.

2. *Below insertion of Deltoid.*—If the line of fracture is transverse, very slight displacement will be produced; if oblique, the lower fragment is drawn upwards by the biceps, coraco-brachialis, and triceps, so as to overlap the upper either in front or behind, according to the direction of the line of fracture.

Complications.—Owing to the close relationship of the musculo-spiral nerve to the shaft of the humerus about its middle, this structure is very liable to be wounded at the time of injury, or it may subsequently become included in the callus by which repair is effected; under these circumstances paralysis of this nerve may accompany or follow the injury (**642**).

Spontaneous Fracture of the shaft of the humerus may occur in cases where the bone is weakened from disease, *e. g.* sarcomatous tumours attacking the shaft of the bone (**461**); gummy deposits in its substance (**446**); locomotor ataxy (**418**); mollities ossium (**452**); rickets (**451**); atrophy (**454**); necrosis (**448**), &c.

Lower Extremity.

440. *Lower Extremity.*—Fractures through the lower end of the humerus are of common occurrence, especially in young subjects, in whom also dislocations of the elbow are very frequently found; four chief varieties of fracture are met with in this situation, *e. g.*:—

1. Transverse Supra-Condyloid.

1. *Transverse supra-condyloid.*—Where the shaft is broken transversely across, just above the condyles.

This injury is of interest, as the symptoms produced are very similar to those met with in dislocation of the radius and ulna backwards.

The line of fracture though transverse is generally somewhat oblique from above, downwards, and forwards; under these circumstances the lower fragment is drawn upwards and backwards behind the upper one by the biceps, brachialis anticus, and triceps.

The symptoms are very characteristic: there is a rough, irregular projection in front of the joint above the bend of the elbow formed by the upper fragment, which pushes forward the brachial artery, and another behind, formed by the lower fragment and bones of the forearm. Crepitus and abnormal mobility will be present, along with pain and swelling about the elbow-joint.

On measurement, the distance from either condyle of the humerus to the olecranon will be found to be normal, while from either condyle to the acromion it will be diminished.

The deformity can be easily reduced, but at once reappears when extension is left off.

In cases where the line of fracture runs in the opposite direction, viz. obliquely from above, downwards and backwards, the displacement will take place in the opposite direction, *i. e.* the lower fragment will be drawn upwards in front of the upper fragment, causing a considerable prominence on the anterior aspect of the joint.

This injury is very liable to be mistaken for separation of the lower epiphysis of the humerus.

Diagnosis of Dislocation and Fracture about Elbow.

441. In the following table the main points of resemblance and of distinction between this injury and dislocation of the radius and ulna backwards (**464**) are mentioned.

Points of resemblance.—The two injuries resemble one another in the following particulars:—

1. They are common in young subjects.
2. The forearm appears shortened.
3. The forearm is semi-fixed.
4. There is a prominence behind the elbow-joint.
5. There is a prominence in front of the elbow-joint, pushing forward the brachial artery.
6. Pain, swelling, and loss of power are present.

Points of distinction.—The two injuries differ from one another in the following points:—

	Transverse Supra-Condyloid Fracture.	*Dislocation of Radius and Ulna Backwards.*
Crepitus.	Present.	Absent, unless associated with fracture of Coronoid Process.
Mobility.	Increased.	Lost (unless as above),
Anterior Projection.	Above bend of elbow; formed by lower end of upper fragment, therefore sharp, rough, and irregular.	Below bend of Elbow; formed by lower articular end of Humerus, therefore broad, smooth, and rounded.
Posterior Projection.	Formed by lower articular end of Humerus, head of Radius, and Olecranon.	Formed by Head of Radius and Olecranon only.
Length of Forearm.	Apparent shortening; no real diminution in length between external Condyle and Styloid Process of Radius.	Real shortening; distance between External Condyle and Styloid Process of Radius is diminished.
Measurement from—		
A. Either Condyle to Olecranon.	Normal.	Lengthened.
B. Either Condyle to Acromion.	Shortened.	Normal.
Reduction.	Effected with ease; deformity reappears when extension is discontinued.	Effected with difficulty; deformity does not reappear, unless accompanied by fracture of Coronoid Process.
Nature of injury	Usually direct violence, *e.g.* blow or fall on elbow.	Usually indirect violence, *e.g.* fall on hand.

2. T-shaped into Joint.

2. *T-shaped Fracture into the Elbow-joint.*—In this injury there is, in addition to a transverse fracture above the condyles, a vertical crack or fissure running between the condyles, and involving the elbow-joint.

The symptoms will be somewhat similar to those met with in the transverse supra-condyloid form, though of a more severe nature, owing to the concomitant injury to the elbow-joint.

There is more pain, with inflammation of the joint itself (Acute Synovitis (469)), consequently swelling, owing to effusion into its interior, is always a prominent symptom, and if considerable, may render the diagnosis of the injury somewhat difficult. The lower end of the humerus will probably appear somewhat increased in width, and crepitus can be readily produced on moving the elbow, or on grasping the two condyles and moving them upon each other.

In this, as in all other injuries involving the joint, the movements of the elbow will probably be left permanently impaired.

3. Separation of either Condyle.

3. *Separation of either Condyle.*—Either condyle of the humerus may become separated by a simple crack or fissure running obliquely across the lower end of the bone, and usually involving its articular surface.

In separation of the outer or the whole of the internal condyle the elbow-joint is necessarily opened. In the case of the inner condyle, its tip, which is more prominent, and consequently more liable to fracture, is often separated without the joint being involved.

The symptoms are as follows:—Pain and swelling about the elbow-joint, with impaired movement; crepitus on grasping or moving to and fro the fractured portion of bone, which is found to be loose: crepitus will also be produced on rotating the radius in the case of the external condyle, and on flexing and extending the forearm when the internal condyle is involved. There is not, as a rule, much displacement of the fractured condyle, though at times it is found drawn downwards by the muscles attached to it, so that the characteristic projection on either side of the joint is somewhat lost.

Complications.—In fracture of the external condyle the musculo-spinal nerve or its subdivisions (more

especially the posterior interosseous nerve), in fracture of the internal condyle, the ulnar nerve, are liable to be wounded at the time of injury, or they may afterwards become included in the callus which is poured out at the seat of fracture. Under these circumstances symptoms of paralysis of these nerves will accompany or follow the accident (**638**).

4. Separation of Lower Epiphysis.

4. *Separation of the Lower Epiphysis*, viz. of the two condyles, trochlea, and capitellum, is an injury frequently met with in young subjects as the result of a fall upon the elbow, occurring almost in the same situation as the transverse supra-condyloid fracture; the symptoms are almost identical with those met with in that injury, differing, however, in the following important points:

In separation of the epiphysis, the ends of the fragments are smooth and rounded, instead of being rough and irregular, as in fracture; crepitus is, therefore, a much less prominent symptom, owing to the fact that the line of separation runs through cartilage and not through osseous tissue. The line of separation is just above the joint, somewhat nearer to it than is often the case in fracture. The accident always occurs under twenty-one years of age.

Partial separation of Lower Epiphysis.—A rare form of injury is described, in which only the trochlea and capitellum are separated, leaving the condyles attached to the shaft of the bone—the so-called "*infra-condyloid separation of the epiphysis.*" The displacement produced is somewhat similar to that met with in separation of the entire epiphysis, the bones of the forearm being carried backwards, but with only the infra-condyloid portion of the epiphysis, the two condyles remaining in their usual position, attached to the shaft of the humerus.

CHAPTER XL

AFFECTIONS OF THE HUMERUS

Enlargement of Extremity of Humerus.

442. *An enlargement or thickening of either extremity of the humerus* may be due to various causes.

- Enlargement of either Extremity of Humerus.
  - Inflammatory . .
    - Periostitis (445, 446).
    - Articular Ostitis (414).
    - Chronic Abscess of Bone (450),
    - Syphilitic Epiphysitis (416).
    - Excessive formation of Callus after fracture (437, 440).
    - Chronic Rheumatic Arthritis (417).
    - Rickets (451).
  - New Growths
    - Exostosis (460).
    - Sarcoma (usually central) (461).

As a general rule, central sarcomata and chronic abscess are much less frequently met with in the lower than in the upper extremity of the humerus.

Enlargement of Shaft of Humerus.

443. An enlargement or swelling of the shaft of the humerus may be due to various causes.

- Tumour or Enlargement of Shaft of Humerus.
  - Inflammatory
    - Periostitis (445, 446).
    - Excessive formation of Callus after fracture (439).
    - Necrosis, where the Sequestrum is surrounded by a Sheath of New Bone (448).
  - New Growths — Sarcoma (usually Periosteal) (461).

Absorption of Head of Humerus.

444. Atrophy or absorption of head of humerus. Cf. (420).

Simple Periostitis.

445. *Inflammation of the periosteum* covering the humerus may be acute or chronic, limited or diffuse; it

may be due to the same causes and will present similar symptoms to the same affection attacking the clavicle (**373**).

In the *acute* affection, there is a deep-seated swelling affecting the shaft of the bone; at the same time the integuments become swollen and œdematous with distension of the subcutaneous veins, but without any redness of the skin in the early stage; there is more or less pyrexia, with local increase of temperature, and great pain increased at night, along with tenderness, on the slightest touch or movement of the part.

The process may subside at this stage, or it may go on to the formation of a periosteal abscess; under these circumstances, the swelling and œdema increase, the integuments become of a reddish or reddish-brown colour, and the neighbouring joint (shoulder or elbow) not unfrequently becomes painful and swollen; at the same time the fever continues and rigors very frequently occur.

If the shaft of the bone can be felt through the œdematous tissues, it will be found distinctly enlarged and thickened, and when suppuration ensues, deep-seated fluctuation will be evident, though in many cases the extreme tension of the superjacent tissues will render the detection of pus, so long as it lies bound down by the periosteum, a somewhat difficult matter.

If the abscess is opened or discharges externally, the symptoms will be at once relieved, and on examination the shaft of the bone will be found bare and denuded of periosteum (acute necrosis); or, it occasionally happens, especially in the case of young children, that if the pus is evacuated in the early stage by free openings, the surrounding soft tissues and periosteum may at once become adherent to the shaft of the bone

again, and this may retain its vitality, so that recovery takes place without any necrosis resulting.

When the symptoms are of a subacute nature, the condition may simulate the presence of a sarcomatous tumour (**461**). When the inflammation is of a *chronic* nature, there will simply be a swelling, either localised, or more or less diffused, connected with the shaft of the bone, tender on pressure, and accompanied by a dull, aching pain, usually worse at night.

Syphilitic Periostitis.

446. *Periostitis of the humerus* is often found in the subjects of congenital or acquired syphilis.

1. Congenital.

1. *Congenital Syphilis.*—In infants a few months old, as the result of epiphysitis (**416**), accompanied by inflammation of the adjacent periosteum and perichondrium, the upper or lower extremities of the humerus at the junction of the shaft and epiphysis are frequently found thickened and enlarged.

The enlargement, which may appear in the form of a distinct ring or collar surrounding the bone, or as a more or less diffused swelling, is often accompanied by loss of power in the arm, "syphilitic Pseudo-paralysis" (**416**), and if separation of the epiphysis ensues, crepitation and abnormal mobility will be found to be present.

The child will probably present other evidences of congenital syphilis, and in many cases, the extremities of one or more of the other long bones will be found similarly affected.

At a more advanced age, *e.g.* 5—20 years, as a result of chronic periostitis, the upper or lower portions of the shaft of the humerus may gradually become enlarged, so that a considerable swelling is produced of the shaft of the bone, the neighbouring joint usually remaining unaffected.

The lower third of the humerus is the favourite situation of this condition; in many cases, ossification takes place in the periosteal thickening, so that it remains as a permanent enlargement of the lower portion of the shaft of the bone.

2. *In Acquired Syphilis.*—The shaft of the humerus may become the seat of secondary or tertiary nodes, which present similar features to those described as occurring on the clavicle (**374**). 2. Acquired.

447. *Acute Osteomyelitis*, or inflammation of the soft tissues contained in the medullary canal and adjoining cancellous tissue of the shaft of the humerus, may occur as the result of injury, *e. g.* compound fractures, operations on the shaft of the bone, where its canal is opened, &c., or, less frequently as an idiopathic affection, apparently as the result of simple exposure to cold; in other cases it may appear in connection with pyæmia. Osteomyelitis.

When unaccompanied by an external wound, the symptoms of this affection, which is always of a very serious nature, are often somewhat obscure, especially in the early stage; it is frequently ushered in with rigors and acute traumatic fever; severe, deep-seated pain is usually felt in the limb with inability to use it.

Swelling is not an early symptom, as is acute periostitis, though slight œdema may be present, indicating some obstruction to the deep circulation; nor is there, at first, much, if any, redness of the skin, for these external evidences of inflammatory action are only present when the inflammation has spread from the bone to the periosteum, and onwards through it to the parts around.

When the periosteum becomes involved, all the symptoms of periostitis will be superadded, and therefore

the diagnosis of the deeper affection of the bone is often extremely difficult.

In osteomyelitis, however, deep-seated pain without much or any swelling, along with general pyrexia, in the early stage are prominent symptoms; while if a periosteal abscess forms and is opened, the temperature does not fall, the pain is not relieved, and the general symptoms do not subside after the pus has been evacuated, if osteomyelitis is present, as they would in a case of periostitis uncomplicated by this condition.

In a large number of cases, death results from blood-poisoning, for inflammation of the veins of the bones often results, giving rise to general pyæmia.

If however the patient survives, or the affection is of a more chronic nature, the pus which forms in the medullary cavity, perforating the shaft of the bone, may make its way externally; under these circumstances, death of a considerable portion of the whole thickness, or of the inner part, of the shaft of the bone will probably result, giving rise to the presence of a sequestrum; cf. necrosis (**448**).

In cases uncomplicated by periostitis, when the diagnosis is doubtful, it is sometimes advisable to make an exploratory incision down to the shaft of the bone; if under these circumstances, the periosteum is found lying loose, or in process of separation from the bone (which however may not show any appreciable change externally), the diagnosis of osteomyelitis will probably be correct, and it will be confirmed if, on trephining the bone, pus is found in its medullary cavity.

When accompanied by an external wound, *e.g.* in cases of compound fracture, somewhat similar symptoms will be present, but the pain is usually of a less severe nature, owing to the fact that the inflammatory

exudation readily escapes through the opening in the bone at the seat of fracture, instead of being pent up, as in cases where there is no lesion of the osseous tissue; under these circumstances, there will usually be a profuse purulent discharge from the external wound, in which the ends of the bone will be found lying bare and exposed, and the medulla will often sprout as a fungating mass from the opening in the medullary canal.

Necrosis.

448. *Necrosis* of the shaft of the humerus is commonly seen as the result of periostitis (**445**) or osteomyelitis (**447**); or it may be the result of injury, *e. g.* compound fracture, when the bone is exposed and deprived of its periosteal covering. When the dead bone is superficial and lies freely exposed on the surface of the living, not surrounded by a sheath of new bone, it is described as an "*exfoliation*," and the process is spoken of as "superficial necrosis."

When the dead bone lies at a distance from the surface and is invaginated or enclosed by a sheath of new bone formed from the surrounding periosteum, it is termed a "*sequestrum*;" if the whole thickness of the shaft of the bone is involved, it is termed "total necrosis;" if only the central portion, "central necrosis."

The sheath of new bone, when one is present, which surrounds and encloses the sequestrum, is usually perforated by one or more openings, termed "*cloacæ*," through which the pus, which is formed in the neighbourhood of the dead bone, makes its way to the surface.

Corresponding with these cloacæ, there are usually sinuses in the soft tissues, through which the pus discharges externally. The presence of sinuses discharging

a fœtid pus, surrounded or covered over by little masses of projecting granulations, leading down to bare, rough, and hard bone, which when struck with a probe, yields a sonorous ring, are usually distinguishing signs of necrosis.

More or less inflammatory thickening of the soft tissues will usually be present in the neighbourhood of the sinuses, and when the sequestrum is surrounded by a sheath of new osseous tissue, the shaft of the bone will be felt to be considerably enlarged and thickened. For the main points of distinction between necrosis and caries, cf. (**449**).

Caries.

449. *Caries* of the articular extremities of the humerus is frequently met with as the result of inflammation attacking the cancellated tissue in these situations (**414**).

It may affect the superficial portion of the bone, "superficial caries," or the cancellous tissue in its interior. When this condition is present, one or more sinuses (as in the case of necrosis) will usually be found, discharging pus, which often contains mixed with it minute particles of osseous tissue, and leading down to the carious bone, which when explored with a probe feels soft and crumbling, and readily breaks down, the probe passing into it with a crisp, crepitant sensation.

Caries differs from necrosis in the following points, though in some cases the two processes may be combined.

1. In necrosis, death of bone takes place in distinct portions, often of considerable size, the process corresponding with gangrene or mortification of the soft tissues.

In caries, death of bone takes place in minute and

imperceptible particles, the process corresponding to ulceration of the soft tissues.

2. In necrosis, the compact tissue of the shafts of the long bones, or of the flat bones, *e.g.* the cranium, is most commonly affected.

In caries, the cancellous tissue of the articular ends of the long bones, or of the short and spongy bones, *e.g.* bones of the carpus, tarsus, bodies of the vertebræ, &c., is most commonly involved.

3. In necrosis, the dead portion of bone, if struck with a probe, feels rough and hard, yielding a sonorous ring.

In caries, the dead bone feels soft and crumbling, readily breaking down, the probe entering it with a crisp, crepitant sensation.

Chronic Abscess.

450. *A chronic abscess* may form in the cancellous tissue of either extremity of the humerus (most commonly in the upper one), though not so frequently as in some of the other long bones, *e. g.* the two extremities of the tibia, its favourite situations. It may occur spontaneously, but in many cases appears as the result of injury, *e.g.* a blow or fall on the shoulder or elbow. The symptoms of this condition, which is the result of a localised inflammation of the cancellous tissue, are fixed pain of a dull, aching, or less frequently, lancinating character, not constant but disappearing at times, and generally worse at night: localised tenderness on pressure is almost always found at some spot, and this symptom is generally constant, being present even when the pain is absent; there is usually very little external evidence of inflammatory action, the skin preserving its normal colour, or being at times slightly reddened and œdematous, and local increase of temperature, if present, is never marked.

In some cases the bone over the affected spot is found a little thickened and enlarged; if situated near the articular surface, the inflammation may, from time to time, extend to the shoulder or elbow-joint, as the case may be, giving rise to occasional attacks of synovitis.

The long persistence of these symptoms, for months or even for years, is generally indicative of localised inflammation, with, probably, the formation of an abscess in the interior of the bone.

If left to itself, the abscess may remain in this condition for years, the surrounding osseous tissue becoming condensed and indurated, "sclerosed;" or the collection of pus may make its way into the adjacent joint, and cause disorganisation of it; or it may, if situated near the surface of the bone, slowly perforate the covering of compact tissue, and discharge externally.

Rickets.

451. In *Rickets*, the humerus may become the seat of changes similar to those found in the other long bones of the extremities, viz. there may be a deficiency in the deposit of lime salts, and at the same time a proliferation of the epiphysial cartilages; consequently, the shaft of the bone is softened, and readily bends, while its articular ends are enlarged and thickened.

In the case of the humerus, the curvature and consequent deformity produced from the former cause, is never so marked as in the bones of the lower extremities, owing to the fact that it is not called upon to support the weight of the body when the child begins to walk; at times, however, it is found somewhat bent, usually about the point of insertion of the deltoid, owing to the action of this muscle in raising and supporting the arm; no doubt it is also partly due to the

habit children often have of supporting themselves, when sitting, on their hands or elbows.

Enlargement of the upper end of the humerus is never very apparent, owing to the thick covering of soft tissues which surround it, but its lower extremity, just above the elbow, may be distinctly thickened and somewhat bulbous.

These enlargements of the ends of the long bones must not be mistaken for those sometimes met with in cases of congenital syphilis (**416**).

In consequence of the changes in the shafts of the long bones, there is a tendency to fracture from very slight violence, but, as a rule, the broken bones readily unite.

Rickets is met with in infants and young children, usually showing itself within the first twelve or eighteen months of life; in exceptional cases, "late rickets," it may not manifest itself till the child is seven or ten years of age, or even older.

One or other of the following symptoms will generally be present, *e. g.* cranio-tabes (Pt. I, 29); bowing of the spine (**698**); peculiar shape of skull (Pt. I, 32); imperfect development of the teeth (Pt. I, 125); beading of the ribs (**740**); changes in the shape of the thorax (**709**); enlargement of the ends of the other long bones (**540**); deformity of the lower extremities; *e. g.* genu varum or valgum; deformity of the pelvis; prominence of the abdomen; general arrest of development, &c.

Rickets is not of itself fatal under ordinary circumstances, though it may indirectly prove so from some complication; *e. g.* in cases where the chest is much deformed, inflammatory affections of the air-passages, to which rickety children are especially liable, and which in healthy subjects would be readily borne, are often

attended by serious and even fatal consequences; notwithstanding the fact that the subjects of it are usually weakly in health—yet, as they grow up, the disease disappears, though the deformities produced are permanent; the bent and distorted bones become gradually strengthened by buttresses of osseous tissue, thrown out in the concavities of the curves, so that, eventually, they become, in all respects, firm and strong.

Mollities Ossium.

452. In *Mollities Ossium* or *Osteo-malacia*, the humerus may become so soft and pliant, that it may yield and bend in almost any direction: in other instances, spontaneous fracture may take place.

This affection, which is of extremely rare occurrence, is characterised by a progressive softening of the bones owing to an increase in the medullary with absorption of the compact osseous tissue: in advanced cases, the cortical layer almost entirely disappears, so that nothing is left except thickened periosteum enclosing cancellous spaces filled with soft medullary tissue.

The disease may be confined to a few bones, most commonly the vertebræ, ribs, sternum, and pelvis; in other cases, the entire skeleton may become involved, so that great deformity is often produced.

It is usually met with in women, in whom it often develops during pregnancy. The urine generally contains lime salts, which have been removed from the bone and excreted by the kidneys.

The subjects of the disease generally suffer from pains of a rheumatic character in the affected limbs and back, and in some cases, tenderness on pressure is a prominent symptom. It is quite incurable, running a very chronic course, and lasting for months or even years, death usually resulting from gradual exhaustion, or from some complication, *e.g.* compression of the

lungs, spinal cord, &c., or interference with the functions of some organ.

From its supposed resemblance to Rickets (451), this affection is sometimes spoken of as "Senile Rickets," but it may be distinguished from that condition by the fact it is very rarely met with before middle life; also by the fact that there is no tendency to recovery, Mollities ossium usually, sooner or later, proving fatal.

Ostitis Deformans.

453. In *Ostitis Deformans* (Pt. I., 33), the humerus may become much thickened, and at the same time more or less curved and increased in length; in most cases, other bones will also be involved, *e.g.* skull (Pt. I, 33), spine, (Pt. I., 308), and other bones of the extremities.

Atrophy.

454. *Atrophy* of the humerus is generally the result of long-continued disuse of the arm, such as occurs in cases of paralysis, or joint-disease with anchylosis: it may also be due to senile degeneration, or be the result of injury, *e. g.* a fracture involving the nutrient artery of the bone and cutting off its supply of blood.

In this condition the compact tissue of the affected bone becomes diminished in thickness, while the medullary canal becomes increased in size owing to absorption of the cancellous tissue, so that the bone is converted into a mere shell. If the cause which produces atrophy is in force before the patient has reached puberty, the growth of the bone both in circumference and in length will be arrested.

In cases of atrophy, fracture is very liable to occur, either spontaneously, or as the result of very slight external violence.

Hypertrophy.

455. *Hypertrophy* of the humerus is generally the result of chronic inflammation of the bone or periosteum covering it, the inflammatory exudation poured out

into the interior and upon the surface of the bone undergoing organisation, and developing into osseous tissue: under these circumstances, the bone is increased in thickness, and in some cases (**456**) it may also be somewhat lengthened. Occasionally this condition may be distinguished during life by the increased weight, thickness, length and slightly uneven surface of the affected bone.

Elongation.

456. *Elongation* of the humerus may occur in cases of hypertrophy of the shaft from any cause, *e. g.* ostitis deformans (**453**); or in cases of joint-disease in young persons, as the result of long-continued hyperæmia at the junction of the shaft and either epiphysis, viz. at those spots where the growth in length is taking place.

Shortening.

457. *Shortening* of the humerus is often found in cases of fracture (**436**) where some overlapping of the fragments has occurred, also in cases of impacted fracture of the neck of the bone (**437**).

It is also met with as a congenital deformity (**681**), or in cases of atrophy (**454**), when this condition dates from youth or childhood, *e. g.* in infantile paralysis (**649**), attacking the upper extremity, and causing a general arrest of development of the limb. It may also occur as a sequel of epiphysitis (**415**), the growth of the bone in length becoming arrested as a consequence of destructive changes occurring to the epiphysial cartilages.

Increased Curvature.

458. *Increased curvature* of the humerus may be due to rickets (**451**); ostitis deformans (**453**); osteo-malacia (**452**); badly-set fractures (**436**).

Tumours.

459. *Tumours.*—The humerus is not unfrequently the seat of exostoses and sarcomatous growths, the former being of a simple, the latter of a malignant character.

460. *Exostoses.*—The articular extremities of the humerus, just at the junction of the shaft with the epiphyses, more especially the upper one, are sometimes the seat of exostoses, usually of the cancellous variety. An exostosis usually presents itself as a slowly-growing, hard, incompressible tumour of moderate dimensions, perfectly immoveable upon the subjacent bone, irregular, conical, or globular in shape, and either sessile or pedunculated. It may be unattended by any pain or other symptoms, but when springing from the upper end of the humerus, inconvenience may be caused from pressure upon the vessels and nerves in its vicinity. Exostoses.

In some instances, exostoses are hereditary and multiple, the ends of several of the long bones being similarly affected. The small, hook-like projection of bone, "supra-condyloid process," sometimes seen on the inner surface of the shaft of the humerus, about two inches above the internal condyle, and which may simulate an exostosis, is really a rudiment of the osseous canal, which in many animals contains the median nerve and brachial artery.

461. *Sarcomata.**—The humerus is not unfrequently the seat of sarcomatous growths of either the central or periosteal variety, the former springing from the interior of the bone, and usually attacking the upper epiphysis, the latter being connected with the periosteum, and generally attacking the shaft. Sarcomata.

1. *Central.*—A central or *myeloid* sarcoma, so called because it contains numerous myeloid (*i. e.* large, multinucleated) cells mixed up with the other elements, 1. Central.

* In the remarks on Sarcomatous Tumour of Bone, I have availed myself of the excellent work on this subject by Mr. H. T. Butlin, entitled "Sarcoma and Carcinoma, their Pathology, Diagnosis, and Treatment."

connected with the upper epiphysis of the humerus, presents itself as a more or less rapidly-growing enlargement of the head or upper extremity of the bone.

As the growth steadily increases in size (originating, as it does, from the cancellous tissue of the interior of the epiphysis), it tends to expand or produce a gradual thinning out of the cortex of the bone; this may become so much thinned, that on making external pressure over the tumour, egg-shell crackling can sometimes be obtained.

The swelling, which is usually somewhat globular and well defined, is often unattended for a considerable time by any pain or other symptoms, and the neighbouring joint generally remains unaffected until late on in the course of the disease, for "the articular cartilage possesses a singular power of resistance or incapacity for contagion."

A central sarcoma of the upper epiphysis of the humerus, might in the early stage be mistaken for inflammatory changes occurring in the interior of the bone, *e. g.* articular ostitis (**414**), but a diagnosis can usually be made if attention is paid to the following points:

In sarcoma, the adjacent joint is rarely affected, and then only in the advanced stage of the disease; in inflammation of the head of the bone, the joint very soon becomes involved.

In sarcoma, even in the early stage, the enlargement is much more marked and more globular in shape than in simple inflammation, and it steadily increases in spite of treatment.

In sarcoma, pain is usually absent for a considerable period, while it is an early and prominent symptom in inflammation. Central sarcomata are in some cases

extremely vascular owing to the presence in their interior of a large number of arteries of moderate size; not unfrequently, small cystoid cavities are also present, with which the vessels directly communicate. Under these circumstances, the tumour may exhibit distinct expansile pulsation and consequently simulate an aneurism.

When this condition, which is variously described as *Angio-sarcoma*, *Osteo-Aneurism*, *Aneurism of Bone*, *Pulsating tumour of Bone*, affects the upper end of the humerus, it may at first sight simulate an aneurism of the axillary artery; for the main points of distinction between the two affections, cf. (426).

2. *Periosteal.**—A periosteal sarcoma springing from the shaft of the humerus, usually presents itself as a rapidly-growing tumour, fusiform or ovoid rather than globular in shape, well-defined, and losing itself above 2. Periosteal

* *Periosteal Sarcomata* may be subdivided into two classes, *Parosteal* and *Subperiosteal*.

In the *Parosteal* variety, the tumour grows by the side of the bone, probably from the outer surface of the periosteum, leaving this structure unbroken and closely adherent to the bone.

In the *Subperiosteal* variety, the tumour as it grows raises the periosteum off the bone, and at the same time often erodes and destroys the compact tissue, penetrating into the medulla and cancellous tissue.

The Subperiosteal Tumours are the ones most frequently met with, the Parosteal being of somewhat rare occurrence; as a general rule, the latter variety are less malignant than the Subperiosteal occurring on the same part of the body. As regards the diagnosis between the two varieties, "I can only say that it appears impossible until the tumour has been freely opened, but may then be easily made by feeling with the finger whether the bone is closely covered with periosteum, or whether the latter is raised and the bone at any part rough and bare."—Butlin, *Lancet*, 1883, vol. ii, p. 228.

and below in the shaft of the bone, along which it tends more or less rapidly to spread.

In some cases the growth affects one side of the bone more than the other; in other instances the whole circumference of the bone is equally surrounded by it.

The surface of the tumour may be smooth or somewhat lobulated and irregular; in some cases it is firm, in others soft, elastic, or of unequal consistence, almost fluctuating in places. When it attains a considerable size the skin covering it often becomes somewhat dusky, and traversed by large and tortuous veins, the result of some obstruction to the deep circulation.

Pain is usually absent in the early stage; consequently any swelling of the shaft of a long bone, rapidly increasing, and unattended in the early stage by pain or tenderness on pressure—the distinctive symptoms of an inflammatory or simple periosteal enlargement—should always be regarded with suspicion as indicative of sarcoma.

When the growth contains bone or cartilage mingled with it, it is described as an *osteo-sarcoma* or *chondro-sarcoma*. Under these circumstances it usually feels firmer to the touch, being hard and indurated in places, and at the same time often of slower growth.

In some cases the shaft of the bone becomes so much weakened by the presence of the growth that spontaneous fracture may ensue.

Diagnosis.—The affection most likely to be confounded with a periosteal sarcoma is subacute or chronic periostitis of the shaft of the bone, for both these affections may follow some injury, *e. g.* a blow, &c. (**445**).

In many cases the diagnosis is easy, for in the one instance the signs of inflammation are absent; in the other they are present; *e. g.* in periostitis there will in

the early stage be pain of a more or less severe nature, with tenderness on pressure, and probably some slight local increase of temperature; sometimes general pyrexia is present, especially at night.

As a general rule these symptoms are all absent in sarcomatous tumours, though in exceptional cases, especially when the tumour is very rapidly growing, all the local and constitutional signs of inflammatory action may be present, *e. g.* the soft tissues over the growth become hot and inflamed, the swelling itself may be so soft that it may appear to fluctuate (thus simulating the presence of pus), and the body temperature may be raised several degrees.

In these cases the effects of treatment may throw some light upon the case; if in spite of perfect rest and soothing applications, the swelling, which is unequal in consistence, continues to increase in dimensions, and at the same time extends along the shaft of the bone, the case may be looked upon as one probably of a sarcomatous nature; in many cases, however, it will still be necessary to make an exploratory puncture or incision into the swelling before a diagnosis can be definitely made.

Course.—Sarcomatous tumours of bone are essentially of a malignant nature, for even if the growth is removed, along with the bone from which it springs, recurrence will probably take place, most commonly in some internal organ, *e. g.* the lungs, the lymphatic glands usually escaping.

As a general rule, a periosteal growth is much more malignant than a central one, and one situated near the trunk more so than another at a distance from it, *e. g.* a central or periosteal sarcoma of the humerus is much more malignant than a similar tumour connected with the radius or ulna.

Diagnosis of Central and Periosteal Sarcomata.

462. In the following table some of the chief points of distinction between central and periosteal sarcomata connected with the long bones are mentioned:

	Central or Myeloid.	*Periosteal.*
Usual situation.	Epiphysis.	Shaft.
Origin.	Cancellous tissue of interior of Epiphysis.	Periosteum of Shaft.
Outline.	Often encysted, *i. e.* surrounded by a bony or fibrous capsule.	Often diffused, infiltrating surrounding parts.
Structure.	Round, spindle or mixed-celled, with more or less myeloid cells; the latter may be altogether absent, or form as much as $\frac{4}{5}$ths of the tumour, but they never constitute its whole bulk.	Round, spindle, or mixed-celled; myeloid cells, if present, only in small proportion, and usually in close proximity to the bone.
Colour.	Maroon, dark-red, or fleshy, if giant-cells are in abundance.	Pinkish.
Secondary changes.	Uncommon.	Chondrification, calcification, and ossification very common.
Pulsation.	Not uncommon; due to rich supply of medium-sized vessels.	Very rare.
Egg-shell crackling.	Sometimes present.	Rarely present.
Rate of Growth.	Often slow.	Often very rapid.
Malignancy.	Less malignant than Periosteal.	Often very great; the more so, the nearer the tumour is to the trunk.
Recurrence in internal organs.	Often occurs, though not so rapidly or surely as in the Periosteal.	Usually rapid.
Infiltration of adjacent structures.	Uncommon; less so than in the Periosteal.	Not uncommon, when tumour of large size.
Glandular implication.	Extremely rare.	Rare.
Age.	Not uncommon in persons advanced in life.	Not uncommon in children and young subjects.

CHAPTER XLI

DISLOCATIONS OF ELBOW (RADIUS AND ULNA)

- Dislocations of Elbow.
  - Radius and Ulna . . . .
    - Backwards.
    - Forwards.
    - Lateral (inwards or outwards).
  - Radius (alone) . . . . .
    - Forwards.
    - Outwards.
    - Backwards.
  - Ulna (alone) . . . . .
    - Backwards.
    - Forwards.
  - Radius and Ulna in different directions, viz. . .
    - Radius forwards.
    - Ulna backwards.

463. *Dislocation of the Elbow* is often met with, especially in young subjects, as the result either of direct or indirect violence, *e. g.* twists, falls, blows, &c., on the elbow or hand. Dislocations of Elbow.

Both bones of the forearm, or only one, may be displaced, and in some cases the dislocation is found associated with fracture of some portion of the articular ends of the bones.

The commonest form of dislocation of both bones is backwards; of the radius alone, forwards; of the ulna alone, backwards.

The different varieties of dislocation that are met with are as follows:

464. *Dislocation of Radius and Ulna* may occur backwards, forwards, or laterally; the displacement backwards is the most common variety, and in fact, the form of dislocation most frequently met with about the elbow. Radius and Ulna.

1. *Backwards.*—In this form the radius and ulna, 1. Backwards.

maintaining their normal relation to each other, are displaced backward, so that the coronoid process is lodged in the olecranon fossa, or, if the dislocation is not complete, rests upon the trochlear surface of the humerus.

Symptoms. — The forearm, which is shortened, is fixed in a slightly flexed position; there is a marked projection behind the joint, formed by the olecranon and head of the radius, the triceps tendon being rendered unduly prominent; in front of the joint and below the bend of the elbow, the lower articular end of the humerus, pushing forwards the brachial artery, forms another projection. If associated with fracture of the coronoid process (**536**), crepitus will be present, along with abnormal mobility, the deformity readily disappearing on making extension, but tending to recur when extension is discontinued. Occurring as it does in young subjects, and resembling in some respects the transverse supra-condyloid fracture or separation of the lower epiphysis of the humerus, which is frequently met with at the same age, these injuries are liable to be mistaken for each other. For the main points of resemblance and distinction cf. Table (**441**).

2. Lateral.

2. *Lateral.*—Lateral dislocations of both bones are usually incomplete, the displacement outwards being most common.

a. Outwards.

a. Outwards.—In the incomplete variety the articular surface of the ulna lies upon the capitellum or external condyle of the humerus; the forearm is fixed in a flexed position; the internal condyle of the humerus is unduly prominent, and there is a depression beneath it; the head of the radius projects on the outer aspect of the joint, and the distance between the olecranon and the internal condyle is increased.

b. Inwards.—In the incomplete variety the head of the radius lies upon the trochlear surface of the humerus or the internal condyle; the forearm is fixed in a flexed position; the external condyle of the humerus is unduly prominent, and there is a depression beneath it; the olecranon projects on the inner aspect of the joint, and the distance between it and the external condyle is increased. *b.* Inwards.

In the complete varieties the articular ends of the radius and ulna will project prominently beneath the skin on the inner or outer aspect of the lower extremity of the humerus, as the case may be.

3. *Forwards.*—This form, which is extremely rare, may occur with or without fracture of the olecranon. 3. Forwards.

Symptoms.—The forearm, which is lengthened, is fixed in a flexed position; the lower articular end of the humerus forms a marked prominence behind the joint, the olecranon, coronoid process, and head of the radius projecting in front. When associated with fracture of the olecranon (**536**), the detached portion of bone can be felt behind the lower end of the humerus; crepitus will be present along with great mobility; the deformity can be easily reduced, but tends to recur.

465. *Dislocation of the Radius alone* may occur in a direction forwards, outwards, or backwards, the displacement forwards being the most common variety. Radius alone.

1. *Forwards.*—Dislocation of the head of the radius forwards may be complete or incomplete, according as the orbicular ligament is ruptured, or only stretched. 1. Forwards.

In the *complete* form, the head of the radius lies on the front of the external condyle of the humerus. *a.* Complete.

The symptoms are usually characteristic: the forearm is fixed in a slightly flexed position, midway between pronation and supination, and its outer border appears

Radius alone.

to be displaced somewhat forwards and upwards. Pronation is possible, but the forearm cannot be supinated more than half-way, nor flexed beyond an obtuse angle, owing to the head of the radius hitching against the front of the lower end of the humerus, where it can be distinctly felt when the hand is rotated; the external condyle of the humerus is unduly prominent, and a depression can be felt beneath it. The dislocation can usually be readily reduced, but when the orbicular ligament is completely ruptured, difficulty is often experienced in maintaining the bone in position, so that the deformity is readily reproduced.

b. Incomplete.

The *incomplete* form is most commonly met with in young children, in consequence of a pull or wrench of the hand or arm. The symptoms are similar to those met with in the complete variety, though not so well-marked as the orbicular ligament, being more lax and yielding, often stretches instead of rupturing, and allows the head of the radius to slip a little too far forwards without being completely dislocated.

Reduction, in these cases, is readily effected, the bone often slipping back into position with a distinct click during an examination of the arm, the pain and other symptoms at once disappearing.

2. Outwards.

2. *Outwards.*—Dislocation of the head of the radius outwards is of rare occurrence; the deformity is usually manifest, the head of the bone projecting on the outer aspect of the external condyle.

3. Backwards.

3. *Backwards.*—Dislocation of the head of the radius backwards is less common than the displacement forwards; the head of the bone can be felt projecting behind the external condyle.

Ulna alone.

466. *Dislocation of the Ulna alone* may take place in either a forward or a backward direction; both dis-

Ulna alone.

placements are of rare occurrence, and in some cases they are found associated with fracture either of the olecranon or coronoid process (536).

1. Backwards.

1. *Backwards.*—In dislocation backwards, the most common variety, the olecranon, forms a marked projection behind the joint, the head of the radius maintaining its normal position, or being slightly displaced; if associated with fracture of the coronoid process (536), crepitus will be present, and the deformity can be readily reduced, but at once reappears when extension is discontinued.

In some cases, this injury is associated with a complete dislocation of the radius forwards (467).

2. Forwards.

2. *Forwards.*—Dislocation of the ulna forwards is of such rare occurrence that it is not mentioned by many writers. When present, a depression will be felt behind the joint, where the olecranon should be, and a prominence will be found in front, formed by the coronoid process; in some cases, the dislocation is associated with fracture of the olecranon process (536).

Radius and Ulna in opposite directions.

467. *Dislocation of Radius and Ulna in opposite directions.*—In rare cases, the ulna is displaced backwards, and the radius forwards. The symptoms present would be a combination of those characteristic of each particular dislocation (465), (466).

CHAPTER XLII

DISEASES OF THE ELBOW-JOINT

Diseases of Elbow-joint.

468. The elbow-joint, owing to its more complicated structure, its more superficial situation, and its more constant exposure to injury, is much more commonly the seat of inflammation and disease than the shoulder; as in that articulation, disease may commence in the synovial membrane or in the articular ends of the bones entering into its formation, and we find the joint very frequently attacked by serous (**469**) or suppurative (**470**) synovitis, pulpy disease of the synovial membrane (**471**), and articular ostitis (**472**) leading to caries or necrosis of the ends of the bones.

Much less commonly it is the seat of rheumatic arthritis (**476**), Charcot's joint disease (**477**), loose bodies (**479**), and neuralgia (**478**).

Serous Synovitis.

469. In *Serous synovitis* (**413**), owing to the superficial situation of the joint, the symptoms are always very evident, much more so than in the case of the shoulder.

If the amount of effusion is at all considerable, swelling will be a prominent symptom, and the form of the swelling will be very characteristic, taking, as it does, the shape of the synovial membrane—viz., the depressions which are normally present behind the joint on either side of the olecranon and triceps tendon, and on the outer aspect of the joint between the head of the radius and the outer condyle of the humerus,

Serous synovitis.

will disappear and be replaced by slight bulgings or prominent swellings; examined from the front, the joint appears broadened and fuller than usual. Fluctuation will also be present, and can usually be readily detected on making pressure on either side of the olecranon.

More or less stiffness, pain, and local increase of temperature will also be present, varying with the acuteness of the inflammation; and if it is at all intense, the skin over the joint is often somewhat reddened. The fore-arm will be held fixed in a semi-flexed and pronated position. There may be general tenderness on pressure, or it may be more marked at one particular spot, usually at the back of the joint between the head of the radius and the humerus.

In subacute cases, where the amount of effusion is slight, or in acute cases when absorption of the fluid is taking place, distinct crepitation or crackling is sometimes heard on laying the hand on the joint and gently moving it to and fro; this is no doubt due to the rubbing together of the opposed synovial surfaces roughened by deposits of lymph upon their interior, or it may be due to the presence of bands or adhesions running from one surface to the other, through and between which the fluid is pressed on any movement of the joint.

In the majority of cases, under proper treatment recovery will take place, the joint being restored to its normal condition, or perhaps left somewhat weakened and subject to recurrent attacks of inflammation, or suppuration (**470**) may ensue. When the inflammation is of a very chronic nature, there may be an absence of any inflammatory symptoms, and under these circumstances distension of the joint with weakness and impairment of its functions may be the only conspicuous

local symptoms; in extreme cases the effusion into its interior is so considerable that the ligaments become stretched, and the joint is rendered practically useless.

This condition, which is much less frequently met with in the elbow than in the knee (its favourite situation), is described as *Hydrops articuli*, or *Hydrarthrosis*.

Suppurative Synovitis.

470. *Suppurative Synovitis*, or abscess of the joint, may commence as a simple serous synovitis (**469**), the inflammation becoming so acute that it runs on to suppuration, pus forming in the interior of the joint.

In many cases, it is due to injury, *e. g.*, a penetrating wound of the joint; or it may appear in the course of a case of pyæmia. In other instances it may be secondary to disease commencing in the soft tissues round the joint, or in the articular ends of the bones (**472**), or in the synovial membrane itself, *e. g.*, pulpy disease (**471**). For example, when an abscess forming in any of these situations opens and discharges its contents into the interior of the joint.

The symptoms of this condition are somewhat similar to those met with in serous synovitis (**469**), though of a more severe type; *e. g.*, there is more swelling, with œdema and redness, often in patches, of the soft tissues round the joint; the pain is more intense, being felt on the slightest movement, and often accompanied by startings of the limb; the local increase of temperature is more marked; there is usually general pyrexia, and in many instances one or more rigors usher in the onset of suppuration.

If the pus is evacuated at this stage, recovery may take place with a stiffened joint, and in young subjects

a considerable amount of movement may often be preserved.

In many instances, however, ulceration of the articular cartilages ensues, the ends of the bones become involved, (articular ostitis, **472**), and the joint becoming more or less completely destroyed, either excision or amputation is required, or recovery takes place but with fibrous or osseous anchylosis (**480**); sinuses (**481**), often form in the neighbourhood of the joint leading down into its interior or to carious and necrosed bone. The ulceration of the articular cartilages and implication of the ends of the bones is usually attended by a grating sensation owing to the rubbing together of their roughened surfaces.

Pulpy Disease of Synovial Membrane.

471. The synovial membrane of the elbow often becomes the seat of a peculiar form of disease termed *Pulpy disease* or *Pulpy degeneration*, or "Brodie's disease," the chief characteristic of which is a pulpy thickening of its structure.

This affection, which appears to be simply a very chronic form of inflammation of the synovial membrane, is commonly met with in persons debilitated from low living or any other cause: it most frequently occurs in connection with the strumous diathesis, hence it is often spoken of as *Strumous Synovitis.*

It may commence without any cause, or may be attributed to some injury, *e.g.*, a blow, fall, or twist of the joint. It is characterised by extreme thickening of the synovial membrane, which is converted into a pulpy, gelatinous structure, consisting of granulation tissue, often an inch or even more in thickness: in many instances, small abscesses form after a time in its substance, and subsequently burst either externally or into the interior of the joint, setting up suppurative

synovitis (**470**). The characteristic symptom of this affection is an indolent, slowly-forming enlargement of the joint, unattended in the early stage by any, or only by very slight, evidences of inflammatory action; *e. g.* there is very little pain, often nothing more than a sense of stiffness in the joint, very slight local increase of temperature, and no redness of the integuments; on the contrary, the skin over the articulation is often paler than usual, hence the term, "white swelling," or "tumor albus," often applied to the condition.

The nature of the swelling is always very characteristic; it is soft, elastic, doughy, and in many instances gives a deceptive idea of fluctuation (true fluctuation is never present, except in cases when there is pus or an increase of synovial fluid in the joint, or when abscesses have formed in the thickened synovial membrane itself); if at all considerable, the swelling tends to conceal and cover in the outlines of the ends of the bones, at the same time masking and obliterating the depressions which are nominally present about the joint: the swelling, which involves the whole joint, is somewhat spindle-shaped, and is evident on both its anterior and posterior aspects, especially behind on each side of the olecranon and biceps tendon, and on its outer aspect between the head of the radius and external condyle of the humerus. Considerable wasting of the muscles above and below the joint is usually present after a time, so that the swelling often appears to be greater than it really is. In favourable cases, the disease may not advance beyond this point, and under proper treatment a gradual absorption of the thickened synovial membrane taking place, recovery may ensue, the joint being left somewhat stiffened and permanently weakened.

In many instances, however, the thickened synovial

membrane gradually extends inwards, spreading over the articular cartilages from their circumference towards their centre, and as it does so, eating them away and causing ulceration or erosion, both of the cartilage itself and also of the subjacent bone.

At the same time, suppuration often ensues, pus forms in the substance of the thickened synovial membrane, in the interior of the joint itself, and also in the surrounding soft tissues. Suppurative synovitis (**470**) is set up, the ends of the bones become involved, (articular ostitis, **472**), from extension of the disease, and the joint becoming more or less completely disorganised is surrounded by sinuses which communicate with its interior.

Articular Ostitis.

472. Disease of the elbow-joint, due to inflammation of the ends of the bones entering into its formation, though less common than pulpy disease (**471**) of the synovial membrane, is frequently met with, especially in the subjects of the strumous diathesis, often as the result of some slight injury.

The symptoms and course of this affection which may commence in the lower extremity of the humerus, or upper end of the ulna, less frequently in the radius, will be very similar to those described, when occurring in the head of the humerus (**414**). The first symptom to attract notice is usually pain of a dull, aching character, increased on movement or upon firm local pressure over the joint. Swelling is not an early or a prominent symptom, as in pulpy disease of the synovial membrane, for the bone itself cannot expand, though after a time it often becomes somewhat enenlarged and thickened from inflammatory effusion beneath and outside the periosteum and also from thickening of this structure itself.

The shape of the swelling is also characteristic, taking as it does the form of the portion of bone affected, *e. g.* the internal or external condyle, or the whole articular extremity of the humerus itself, or the upper end of the ulna, will often appear thickened and apparently expanded.

The nature of the swelling will also be different to that met with in chronic synovitis (**471**), being firm and hard, not soft and elastic; it does not tend to mask the outlines of the bones as in that affection, but rather to render their outline more prominent.

Tenderness on pressure over the affected bone is usually a prominent symptom, along with distinct increase of temperature, and in many cases the skin will present evidence of inflammatory action, being more or less reddened. The arm will be held stiff in a semi-flexed position, and all movement will be resisted by the patient.

Implication of the articular cartilages will be characterised by the presence of painful startings of the limb, especially at night, and when ulceration or erosion ensues and the ends of the bones become exposed, a crepitating or grating sensation will be felt on any movement of the joint, except in cases where the roughened surfaces are covered over by granulations. In many cases, there will be a formation of pus within the interior of the joint, and if caries or necrosis of the ends of the bones results, dislocation (most commonly of the radius, in a direction either forwards or backwards) may ensue and the joint becomes completely disorganised; if, under these circumstances, recovery takes place, it can only be with anchylosis (**480**).

In the following table the main points of distinction between articular ostitis and pulpy disease of the

synovial membrane (471) in the early stage are mentioned. In the later stages, when the disease has spread from the bone to the synovial membrane, or *vice versâ*, and all the parts of the joint have become involved, there will be a combination of the symptoms characteristic of either affection.

Diagnosis of Articular Ostitis and Pulpy Synovitis.

473. *Differential Diagnosis of Articular Ostitis and Pulpy Disease of the Synovial Membrane in the Early Stage.*

	Articular Ostitis.	*Pulpy Disease of Synovial Membrane.*
First symptom.	Pain at some part of the joint, often felt for a considerable time before any swelling is apparent.	Swelling of the joint, usually present for some time before much or any pain is complained of.
Character of pain.	Dull and aching, intermittent, and subject to variation.	At first, simply a weakness or stiffness is felt in the joint, rather than any actual pain.
Increased local temperature.	Usually present from the first at some part of the joint, *i.e.* over the inflamed portion of bone.	Absent at first, or only present to a very slight degree and affecting the whole surface of the joint.
Swelling.	Very slight; absent at first, often for considerable period.	Present from the first, gradually increasing.
Shape of swelling.	An exaggeration of the outline of the affected bone or bones.	A general enlargement of the joint, taking the shape of its synovial membrane.
Consistence of swelling.	Firm and hard, and apparently bony.	Soft, doughy, and elastic; often semi-fluctuating.
Redness.	Often present, and localised over the inflamed bone.	Absent, the joint being paler than usual.
Ends of bones.	The outline of the affected bone or bones is apparently enlarged and rendered more prominent than usual.	Their outline is concealed and masked by the swelling; if they can be felt through it, their outline will be found normal.
Inter-articular pressure.	Attended from the first by considerable pain.	Not attended by much, usually by no, pain.

Acute Epiphysitis.

474. *Acute Epiphysitis.*—In young children the epiphyses of the bones entering into the formation of the

elbow-joint may become the seat of acute inflammation, as in the case of the shoulder-joint (**415**). If under these circumstances suppuration ensues, necrosis of the ends of the bones, "epiphysial necrosis," or separation of the epiphysis, is very liable to occur.

Syphilitic Epiphysitis.

475. In infants, the subjects of congenital syphilis, changes are often met with in the epiphyses of the bones entering into the formation of the elbow-joint, similar to those described as occurring in the upper extremity of the humerus (**416**).

Similar thickenings at the junction of the shafts and epiphyses of the lower end of the humerus and upper ends of the radius and ulna, and a similar loss of power, "syphilitic pseudo-paralysis," will often be observed. Separation of one or more of the epiphyses may result, and in exceptional cases suppuration may take place in or around the joint.

Rheumatic Arthritis.

476. *Chronic Rheumatic Arthritis* (**417**) may attack the elbow-joint, though much less frequently than the shoulder. Similar symptoms will be present, and owing to the superficial position of the articulation, the presence of osteophytes round about it can usually be plainly detected.

There will, after a time, be the same osseous enlargement of the ends of the bones entering into its formation, with more or less crepitation and stiffness, and the affection will run the same chronic course without any tendency to suppuration. In severe cases the joint becomes completely fixed, and consequently almost altogether useless.

At times one or more of the osteophytes may become detached, and be found lying loose in the interior of the joint, giving rise to one form of "loose body" (**479**).

Charcot's Joint-disease.

477. The elbow, though much less frequently than the

shoulder, may become the seat of *Charcot's joint disease* (418); the affection runs a similar course, and in many cases the radius and ulna become completely dislocated.

Hysterical and Neuralgic Affections.

478. *Hysterical and Neuralgic Affections.*—In some cases, usually in young or unmarried females, or in males of a weak or nervous temperament, the elbow, like the other larger joints of the body, may become the seat of excessive pain, with extreme sensitiveness on manipulation, and yet on careful examination, beyond stiffness of the joint, and possibly some slight swelling or puffiness round about it, no evidence of any abnormal action can be detected.

In most cases this condition is one of the local evidences of hysteria, other symptoms of which will on examination generally be found to be present.

The diagnosis of this condition from organic disease is in some cases difficult, but can usually be made by attention to the following points, viz., the general absence of any inflammatory symptoms, especially of local increase of temperature; the inconsistent nature of the symptoms, *i. e.* the disproportion between the pain said to be present and the evidence of any abnormal action; the extreme tenderness usually complained of on the slightest pressure; the fact that if an examination is made under anæsthesia, the movements of the joints are found to be perfectly free, and in all respects quite normal; the general condition of the patient, who is usually of a nervous or hysterical temperament, and in most cases of the female sex.

Loose Bodies.

479. *Loose Bodies* or *Loose Cartilages*, as they are termed, are rarely met with in the elbow-joint, much less frequently than in the knee, their favourite situation.

They usually appear as small moveable bodies, varying

in size, shape, and number, consisting in most cases of fibrous tissue, more or less completely calcified, less frequently of bone, or of a mixture of bone and cartilage. In some cases they appear to be hypertrophied fringes or processes of the synovial membrane, which have become detached.

In cases of rheumatic arthritis (476) they are probably osteophytes, which have become loosened and made their way into the interior of the joint. In other instances they appear as the result of some injury, and under these circumstances may be due to separation of a portion of the articular cartilage and subjacent bone, or to organisation and hardening of blood-clots within the joint.

They may be single or multiple, and may lie loose in the joint, or be attached to some fold of the synovial membrane.

The symptoms caused by their presence vary. In some cases they give rise to no trouble for a considerable time, but sooner or later becoming caught between the articular ends of the bones, the joint is suddenly locked, and extreme pain, often of a sickening character, is produced, the result, no doubt, of the stretching of the ligaments and pressure upon the articular surfaces of the bones.

The pain usually continues until the body slips away, or is pushed back from between the ends of the bones into some pouch of the synovial membrane.

The loose body can often be felt on manipulation at some part of the joint, very commonly on one or other side of the olecranon, or just above it, but it will readily slip away and disappear on slight pressure.

The joint, after a time, becomes subject to recurring

attacks of synovitis (**469**), and in many instances becomes permanently weakened.

Anchylosis.

480. *Anchylosis* of the elbow is often met with, as the result of changes occurring inside or outside the joint, and as in the case of the shoulder, it may be either false or fibrous, or true or osseous (**421**).

It is very frequently met with after fractures, extending into the joint, or occurring in its immediate neighbourhood; also after dislocation of the elbow, or other injuries, where the joint has been kept long confined in splints.

Sinuses.

481. *Sinuses* about the elbow are often met with, as the result of non-closure of the cavity of an abscess, which has formed in this situation, perhaps most commonly in connection with destructive disease of the elbow-joint, symptoms of which will have preceded or accompanied its formation.

Under these circumstances, the orifices of the sinuses may be found at any point around the joint, a favourite situation being behind on the outer side of the triceps tendon, and if a probe is introduced, it will lead either into the interior of the joint, or down to carious and necrosed bone.

In many instances, sinuses are found on the posterior aspect of the elbow, over the olecranon process, in connection either with suppuration of the bursa (**531**), which lies over this bony prominence, or necrosis of the olecranon itself.

CHAPTER XLIII

CUTANEOUS AND OTHER AFFECTIONS OF ARM AND FOREARM

482. *Roseola* is characterised by an eruption of small, rose-coloured spots, slightly elevated, disappearing temporarily upon pressure, usually lasting for a few days, and then fading away. Slight constitutional disturbance is generally present, and the rash, which is not uncommon in children, is often associated with some derangement of the digestive organs. Its usual situation is the neck and chest, but it often extends to the upper extremities. Roseola.

Syphilitic Roseola is usually one of the earliest skin affections of constitutional syphilis, often showing itself on the flexor aspect of the limbs, as well as on the trunk, about the sixth or eighth week after the appearance of the primary sore. It differs from the simple form in the following points: the spots are less red, usually changing to coppery-brown before disappearing; they last for a longer period, usually for several weeks; the eruption is accompanied by less constitutional disturbance, viz. there is, as a rule, no pyrexia, though there may be the general malaise which ushers in the early evidences of the disease, other symptoms of which will generally be present, *e.g.* induration at the point of contagion, and enlargement of the nearest group of lymphatic glands, sore throat, nocturnal headache, pains in the limbs, &c.

Urticaria.

483. *Urticaria* is characterised by the appearance of wheals, like those caused by the stings of nettles (hence the term, "nettle-rash"), situated on red, hyperæmic patches of skin; the eruption, which appears and disappears suddenly, is usually accompanied by severe tingling and itching of the affected part. It is often the result of some error in diet, and may or may not be attended by slight constitutional disturbance.

Lichen.

484. *Lichen* is often met with about the extremities, as well as on the trunk. It is characterised by the presence of small red papules, or pimples, accompanied by itching and tingling, lasting for a variable period, and then disappearing, often with slight desquamation of the cuticle.

Syphilitic Lichen is one of the early skin eruptions of constitutional syphilis, appearing at a somewhat later stage than roseola (**482**), with which, as well as with psoriasis (**485**), it is often found associated; indeed, the papule often forms the base upon which the squamous syphilide develops. It may be recognised by the coppery colour of the eruption, and the tendency of the papules to appear in circles, or curved figures; also by the fact that it is usually associated with other eruptions, *i. e.* roseola or psoriasis, and that, in most cases, other evidences of the constitutional affection will be found to be present.

Psoriasis.

485. *Psoriasis* is characterised by the production of masses of white, silvery scales, situated on slightly inflamed portions of skin. When attacking the extremities, it mainly affects their extensor surfaces, the back of the elbow and front of the knee being favourite situations of the eruption.

Several varieties of psoriasis are described, according to the size and shape of the patches, *e. g.*:

P. punctata, when the patches are of small size, not larger than a pin's head.

P. guttata, when the patches are somewhat larger, and appear to have been dropped on the skin.

P. nummularis, when the patches are still larger, *e. g.* about the size of a shilling.

P. circinata, or *Lepra*, when the patches, healing at the centre, and spreading at the circumference, form distinct rings.

P. gyrata, when the patches spread, not in rings, but in curved and serpentine forms.

P. vulgaris, when the patches coalescing with one another, a considerable extent of surface is involved.

Syphilitic psoriasis is usually one of the early manifestations of constitutional syphilis, appearing at a somewhat later period than (though often in connection with) the papular syphilide, *i. e.* lichen (**484**), usually about three or four months after infection. In other cases it shows itself at a somewhat later stage; cf. also Palmar Psoriasis (**588**).

It differs from the simple form of the eruption in several important particulars, enumerated in the following table:

Diagnosis of Simple and Syphilitic Psoriasis.

486. *Differential Diagnosis of Simple and Syphilitic Psoriasis*

	Simple.	*Syphilitic.*
Situation.	Mainly attacks extensor surface of limb, especially the back of elbow; may be unilateral or symmetrical.	Mainly attacks flexor surface of limb; usually symmetrical.
Shape of patches.	No definite shape; usually irregular.	Usually circular or crescentic; often spreads in the form of rings (P. circinata), or with wavy outline (P. gyrata).
Size of patches.	Often considerable, involving a large extent of surface (P. vulgaris).	Small, or of medium size (P. punctata, guttata, nummularis).
Margin of patches.	Not well-defined, often merging gradually into healthy skin.	Usually well-defined.
Production of scales.	Abundant, so as to form a thick covering.	Scanty, so as to form a thin covering.
Appearance of patches.	White, glistening, and silvery.	Greyish and transparent; centre of patch often bare and denuded of scales.
Nature of eruption.	A purely scaly one.	Often mingled with the macular (Roseola) and papular (Lichen) Syphilides, the papule forming the base on which the scales develope; in places, superficial ulceration may occur, and thin scabs may form on the patches.
Colour of skin beneath scales.	Red and hyperæmic.	Often coppery, or "raw-ham" coloured.
Itching.	Often present.	Usually absent.
Age.	Common in young subjects, first appearing during childhood.	Rare before adult age.
Duration.	Often persistent and tends to recur.	Soon disappears under specific treatment.

487. *Scabies* is a contagious disease produced by the burrowing of an arachnid, the "*acarus scabiei*," the presence of which in the skin causes considerable itching and irritation, and an eruption is produced of a papular, vesicular, or pustular character. When the upper extremity is involved, the parts chiefly affected are the thinner portions of the skin, *e. g.* the bend of the elbow, the flexor surface of the forearm, especially above the wrist, and the spaces between the fingers. Scabies.

On careful examination small cracks or furrows—"cuniculi"—can usually be distinguished, leading from the vesicles or pustules, and terminating in small dilatations, in which the acarus will be found.

Scabies can usually be readily distinguished by the mixed nature of the rash and its situation; the presence of the insect; the severe itching, always worse at night, when the patient is warm in bed; in many cases there will be a history of contagion, and several members of the same household will often be simultaneously affected.

488. *Eczema* is characterised by an eruption of successive crops of small vesicles, situated on patches of inflamed skin. The vesicles, constantly bursting and discharging their contents, keep the surface moist, a clear alkaline slightly yellowish fluid continually oozing from it, or the discharge dries up on the surface, thin scabs or crusts forming on it; in other cases the contents of the vesicles become purulent, and distinct pustules appear. Eczema.

The chief varieties of eczema, which may appear as an acute or a chronic affection, are as follows:

E. simplex, when the inflammation of the skin is not severe.

E. rubrum, when the inflammatory symptoms are well marked, and there is a constant oozing of clear fluid from the inflamed surface, which is of a bright red colour.

E. impetiginodes, when the contents of the vesicles become purulent, and the discharge, drying up, forms thick yellowish crusts.

E. siccum or *squamosum*, when there is little or no discharge, simply a formation of thin incrustations or scabs on a dry, reddened surface.

Eczema is one of the commonest forms of skin disease; it may occur without obvious cause in persons who are otherwise apparently quite healthy; it is often met with in strumous or gouty subjects, sometimes in connection with chronic renal disease. In many cases it is due to some cause of local irritation; cf. eczema of the hands (**581**).

The pustular form of eczema is especially common in children the subjects of the strumous diathesis, and in many cases it leads to superficial excoriation or ulceration of the skin.

Eczema may attack any part of the upper extremity, involving a greater or less extent of surface; one variety, E. rubrum, most commonly attacks the flexor surface, especially about the elbow.

Herpes

489. *Herpes* is characterised by an eruption of vesicles on slightly-inflamed patches of skin, arranged in groups, and often preceded by a sensation of heat and local pain or smarting of a neuralgic kind.

The vesicles, which are distinct from one another and well formed, do not burst as in eczema (**488**), but, their contents becoming opaque, dry up, forming thin crusts, which fall off in the course of a few days, leaving slight reddish stains or permanent scars.

The patches of herpes usually follow the distribution of a cutaneous nerve (cf. also H. zoster (721)), and when attacking the upper extremity may follow the course of any of the cutaneous branches of the arm or forearm.

In some cases of H. zoster (721), the vesicles are found on the inner aspect of the arm as well as on the chest-walls, following the course of the intercosto-humeral nerve, as well as that of the main branch of the second intercostal nerve itself.

Syphilitic Tubercles.

490. *Syphilitic Tubercles.*—The "tubercular syphilides" appear as small, hard, flattened nodules, of a coppery colour, occurring singly or collected into groups. They depend upon a deposit of gummatous matter in the substance of the corium, appearing in the later secondary and tertiary stages of the constitutional affection, and are very liable to ulcerate and break down, giving rise to the presence of the superficial syphilitic ulcers (499).

Ecthyma.

491. *Ecthyma* is characterised by the development of large, round, isolated pustules, situated on red and indurated bases; the contents of the pustules drying up form thick, brownish scabs, and when these separate and fall off a reddened scar is left behind. In other cases, the pustules bursting, or the scabs becoming detached before healing has taken place beneath, a superficial ulcer is produced.

Ecthyma is often met with as one of the late skin eruptions in constitutional syphilis, and under these circumstances the ulceration which results often tends to spread with curved and crescentic outline (499).

In other cases it occurs in the badly-nourished and cachectic ("*E. cachecticum*"), being often met with in

children the subjects of the strumous diathesis, and giving rise to a superficial and unhealthy form of ulceration (500).

Rupia.

492. *Rupia* commences with the development of small bullæ, situated on inflamed bases; the contents of the bullæ, soon becoming purulent, dry up into thick, dark scabs, beneath which the ulceration spreads, while the scabs, remaining adherent, and gradually increasing in thickness by deposits from beneath, assume a conical, or "limpet-shaped," appearance, which is always very characteristic.

In other cases, the scab becomes accidentally detached, and a circular ulcer is formed, which often tends to spread.

Rupia is almost always due to syphilis, occurring as a late or tertiary symptom; in exceptional cases, however, it is met with in conditions of extreme cachexia, from any cause, and may then be associated with ecthyma (491).

Tinea Circinata.

493. *Tinea circinata*, or "ringworm of the body," a contagious disease, due to the presence of the vegetable parasite, *Tricophyton tonsurans*, may attack the upper extremity, as well as the trunk and scalp; cf. Tinea tonsurans (Pt. I, p. 23). It is characterised by the presence of circular patches, covered with branny scales, and in many cases presenting, at their margins, a ring of minute vesicles. As the patches gradually enlarge, they fade in their centre, so that after a time distinct rings are formed, enclosing apparently healthy skin, and by the coalescence of adjacent rings, somewhat irregular figures are often produced.

On microscopic examination of the scales, the spores and tubes of the parasite can generally be detected.

From the presence of the minute vesicles at the

margin of the patches, the term, "*Herpes circinatus*," is sometimes applied to this affection.

494. *Keloid of Alibert* is the term applied to a peculiar condition of the skin, which frequently attacks the cicatrices of burns, or any other extensive and slowly-healing wound, accompanied by considerable loss of tissue. Keloid.

It presents itself in the form of gigantic tubercles, or nodular, elevated patches of oval or fusiform shape, sending out claw-like processes,* at first of a red or pinkish colour, but subsequently, as they extend, tending to become paler. Tenderness on pressure is often present, with, in many cases, a peculiar tingling or burning sensation.

This condition appears to be due to excessive formation of scar-tissue, and, if examined microscopically, the growth is found to consist merely of lowly-organised fibrous tissue. If removed by operation, the same condition almost invariably recurs in the new cicatrix.

Keloid of Alibert must not be confounded with morphoea, or keloid of Addison, the favourite situation of which is the face (Pt. I, 70).

495. In rare instances, the upper extremity may become the seat of *Elephantiasis*, *i. e.* as the result of hypertrophy of the skin and subcutaneous tissue, it becomes immensely thickened and increased in size. At first the skin is smooth and shining, but after a time it generally becomes tubercular and warty, often falling into folds. Elephantiasis.

This condition, which is much less frequently met with in the arm than in the leg, is usually the result of some long-standing obstruction to the lymphatic circu-

* Hence the term "Keloid," derived from Χηλη, a crab's claw, and εἶδος, shape.

lation. It may be produced in various ways, *e. g.* from suppuration in the axilla or neck, causing destruction of the lymphatic channels; tumours in the same regions, involving the lymphatic glands or vessels; recurring attacks of lymphangitis (**502**), &c. Under these circumstances, it may be produced without any apparent implication of the venous trunks.

This condition may be distinguished from simple venous œdema (**505**) by the firmer and more brawny nature of the swelling, which does not pit upon pressure, by its persistency, and also by the actual hypertrophy of the skin itself.

Erysipelas.

496. *Erysipelas* may attack the arm in any of its different forms, presenting characters similar to those described (**593**). It is usually met with in connection with some wound or breach of surface, and may commence primarily in the arm, or be due to extension from the hand (**593**).

Erythema Nodosum.

497. *Erythema nodosum* is the term applied to a special form of erythema (**592**), usually met with on the anterior surface of the legs, less frequently on the arms, in young females of weakly habits, often in connection with some menstrual irregularity; in other cases, it is associated with rheumatism.

It appears in the form of oval patches, slightly raised above the level of the surrounding skin, tender to the touch, and accompanied by pain of a smarting character. The swellings, which vary in size from 1½ to 3 or 4 inches in length, are at first of a bright red colour, but in the course of a few days they become darker and livid, and then gradually fade away, slight desquamation of the cuticle taking place as the inflammation subsides.

The eruption is usually symmetrical, affecting both

arms, and it is generally accompanied by more or less constitutional disturbance, *e. g.* slight elevation of temperature and derangement of the alimentary canal.

The simple form of erythema (**592**) may also attack the arms.

498. *Ulceration* of the arm is often met with in patients suffering from constitutional syphilis (**499**), or in the subjects of the strumous diathesis (**500**). It may also be due to lupus (**501**), or appear in connection with eczema (**488**), ecthyma (**491**), rupia (**492**), &c. In other cases, it is of traumatic origin, occurring in cases where there has been destruction of the soft tissues from injury. In rare instances, epithelioma and rodent ulcer may attack the arm, presenting symptoms similar to those described (Pt. I, p. 34). Ulceration.

499. *Syphilitic ulceration.*—Ulceration of the arm is often met with as one of the later symptoms of constitutional syphilis. It may occur under two chief forms, either as a superficial or a deep affection. Syphilitic Ulceration.

1. *Superficial ulcers* are often met with as late secondary symptoms, in connection with ecthyma (**491**) and rupia (**492**), the bursting of the pustule in the former case, and the detachment of the scab in the latter, being followed by the appearance of a superficial ulcer, which often tends to spread. In other cases, they are due to the breaking down of the tubercular syphilides, or deposits of gummy material, which form in the skin. 1. Superficial Ulcers.

The ulcers which appear under these circumstances present a characteristic appearance. They are usually symmetrical (affecting both limbs) and multiple, occurring in groups, with clean-cut, punched-out edges. The form which they assume varies, being usually circular, crescentic, horse-shoe, or kidney-shaped. They often

appear in successive crops, and exhibit a tendency to heal at one point while they extend painlessly at another, hence the term, "serpiginous," usually applied to them. The base of the ulcer, which is more or less excavated, is usually covered with an unhealthy-looking, greenish-yellow secretion, which often scabs on the surface.

Under specific treatment they readily heal, leaving behind smooth, well-defined, indelible, white scars, depressed below the level of the surrounding skin, and which present the same characteristic circular or crescentic shape. In many cases, scars of this nature will be present, either in the neighbourhood of the ulcers, or on some other part of the body, *e. g.* the lower extremities, face, &c., and the patient will usually present other evidences of the constitutional affection.

Any part of the arm may be attacked by these superficial ulcers, a very favourite situation being the posterior aspect of the elbow-joint, and, as already mentioned, both the upper limbs are often similarly affected.

Their characteristic features are their multiplicity, symmetry, situation, shape, edges, and serpiginous nature.

2. Deep Ulcers.

2. *Deep ulcers* are generally tertiary lesions, being due to the softening and breaking down of gummy deposits, which have formed in the subcutaneous tissue or substance of the muscles themselves (525).

Under these circumstances a deep ulcer is formed, often somewhat circular in shape, with clean-cut, perpendicular edges; its base, which is deeply excavated, and may be formed by the subjacent fascia, muscle, periosteum, or even the bone itself, is usually irregular,

and covered by an adherent, greyish-yellow, "wash-leather" slough.

In the vicinity of the ulcer there is at first a ring of induration, due to the presence of the gummy deposit in the surrounding tissues; but this, as it softens and breaks down, gradually disappears, falling into the ulcer, which at the same time extends and increases in size.

Deep syphilitic ulcers are more commonly single than multiple, and, as a rule, they are non-symmetrical.

They vary considerably in size, averaging from half to three or four inches in diameter. When repair takes place, a depressed white cicatrix is left, surrounded by an areola of pigment, which after a time altogether disappears.

The characteristic symptoms of this form of ulcer are its depth, circular shape, and punched-out edges, the appearance of the base, the painless nature of the ulceration, the fact that in many cases only one is present, and that on inquiry it will be found to have been preceded by the formation of "a lump," *i. e.* a gummy deposit (525) beneath the skin.

Strumous Ulceration.

500. *Ulceration* of the arm is often met with in strumous subjects, presenting somewhat characteristic symptoms. The ulcers, which are frequently multiple, appearing in groups, are of a superficial nature; in the early stage they are commonly round or oval, and of small size; but, as a rule, they tend to spread, coalescing into irregular shapes, and forming large ulcers, which present a peculiar worm-eaten appearance.

There is generally no thickening or elevation of their margins, which are usually thin and undermined for a considerable distance; the surrounding skin is congested, and of a dusky or purplish colour; the base of

the ulcer is uneven and covered with large flabby granulations, which often project above the level of the skin, bleeding readily and discharging a thin curdy pus.

Ulcers of this kind are usually very chronic in their course, remaining in a stationary condition for a considerable period; or the soft granulation tissue, skinning over in places, may form unstable cicatricial tissue, which is soft, pulpy, and deep coloured, readily breaking down again.

In other cases the cicatrix, which forms after healing has taken place, is firm and stable, presenting a characteristic appearance; it is usually somewhat deep coloured, dense, thick, heaped up, puckered, and cord-like, being raised above the level of the surrounding integument, in the form of little ridges or tongues of skin, differing, therefore, very distinctly from the white depressed scar of syphilitic ulceration (**499**).

Strumous ulceration may attack any portion of the arm, and, as in the syphilitic variety, it is not unfrequently found in the neighbourhood of the elbow-joint.

It is most frequently seen in children or young subjects, who will generally present other evidences of the strumous diathesis.

Lupoid Ulceration.

501. *Lupoid Ulceration.*—Lupus may attack the extremities, though not so commonly as other parts of the body, *e.g.* the nose, cheeks, &c. The forearm is more commonly attacked than the upper arm, the wrist and back of the hand being especially liable. It depends upon a deposit of small round cells, mixed with which are often giant cells, in the substance of the corium, more especially round, and in the adventitia of the vessels in the plexuses of the sweat and sebaceous glands.

It is characterised by an eruption of pale or reddish tubercles, occurring either singly or in groups, and giving the skin a dotted appearance.

In some cases, *lupus non-exedens*, absorption of the deposits takes place, and the tubercles becoming shrunken and flaccid, the skin over them wrinkles, and becomes covered with whitish scales; when these separate and come away, a smooth, white, slightly-depressed cicatrix is left behind.

In other cases, *lupus exedens*, the deposits, and consequently the tubercles, break down and ulcerate, giving rise to the presence of a lupoid ulcer, which presents the following appearance:—The edges of the ulcer are sharp, irregular, eroded, sometimes slightly raised and thickened, and the characteristic tubercles are generally present in its vicinity; the base is covered over with granulations secreting pus, which often scabs on the surface; the ulcer tends to spread slowly without any pain, healing at one part and breaking down at another, the extension of the ulceration being generally preceded by the development of tubercles in the surrounding healthy skin; spreading in this way from a single centre, or by the coalescence of contiguous patches, a considerable extent of surface may gradually become involved, and as cicatrisation takes place, considerable deformity may be produced from the contraction which ensues, *e. g.* the elbow, wrist, or fingers may become permanently flexed.

Lupus is most commonly met with in young subjects, often in connection with the strumous diathesis.

For the diagnosis between lupous ulceration, epithelioma, and rodent ulcer, cf. (Pt. I, p. 34).

Lymphangitis.

502. *Lymphangitis, Angeioleucitis*, or *Inflammation of the Lymphatic vessels* of the upper extremity, is often

met with, usually in connection with a wound, or some cause of irritation on the hand or arm; much less frequently it originates spontaneously, without any apparent breach of surface or source of irritation.

The inflamed vessels, when superficial, appear as fine, red lines running from the wound, or cause of irritation, along the forearm to the glands in front of the elbow, or above the inner condyle of the humerus, or along the inner aspect of the upper arm to the glands in the axilla.

The red lines, which may commence at the source of irritation, or at a little distance above it, may be continuous, or interrupted here and there; they may be distinct from one another, running parallel as fine, red streaks, or they may cross and interlace, forming broad bands of varying width, presenting at intervals distinct patches of redness, which may simulate erysipelas (**496**).

More or less pain and tenderness will be felt along their course, and the glands, to which the lymphatics run, in the case of the forearm, those about the elbow (**530**), in the case of the upper arm, those in the axilla (**423**), will be found enlarged, painful, and tender upon pressure.

When the deeper vessels are involved, more or less œdema of the limb is generally present.

In favourable cases, the process may terminate at this stage, and recovery may ensue; or, suppuration may take place, abscesses forming in the inflamed glands, or at different points in the course of the lymphatic vessels.

In other instances, when the lymphangitis is of a severe nature, and due to the introduction of some septic poison into the wound, it may be followed by symptoms of septicæmia or pyæmia.

Diagnosis.—From *erysipelas* (**496**), with which it is very closely connected, the two affections often occurring together, lymphangitis may be distinguished by the fact that, in the former condition, the redness which surrounds the wound, at any rate at first, is more uniform, not appearing in the form of streaks or fine lines, but involving a much larger extent of surface. Erysipelas also spreads much more rapidly along the limb, its outline is more distinct, and the glandular implication, though often present, is not so constant.

From *Phlebitis* (**503**), it may be distinguished by the fact that, in the latter affection, the affected veins appear as knotted cords, to be distinctly felt beneath the skin, usually less apparent to the eye than to the touch, just the reverse of what is the case in lymphangitis. If superficial, the affected veins appear not as fine, red streaks, but as prominent, broad cords, of a purplish or reddish-blue colour, less numerous, less tortuous, following the course of the veins, and not terminating in the lymphatic glands about the elbow, or in the axilla, these structures being very frequently not involved.

Phlebitis.

503. *Phlebitis*, or *Inflammation of the Veins*, when occurring in the upper extremity, is usually of traumatic origin, appearing in connection with some wound or injury involving the vessels. It may be of two kinds, adhesive or suppurative.

1. Adhesive.

In *Adhesive Phlebitis*, the affected vein, or veins, will, if superficial, be apparent as indurated cords, plainly perceptible beneath the skin, tender on pressure, and presenting at intervals, corresponding with the position of their valves, distinct knotty enlargements.

In many cases, the affected vessel will be rendered

unduly prominent, being slightly raised above the level of the surrounding skin, and redness of a dusky hue will often be observed along its course.

More or less pain will be complained of, aggravated on any movement of the part; the arm is stiff, and held in a flexed position.

In some cases, the adjacent healthy veins are somewhat distended from the extra duty thrown upon them, and the limb may become swollen and œdematous, but the latter is never a very prominent symptom unless the deeper vessels are also involved.

The induration, which is present in the course of the affected vessel, is partly due to coagulation of blood, *i. e.* thrombosis, in the interior of the vein, partly to inflammatory changes in the tissues round about it; the dusky redness, when present, is also due to the latter cause.

When the deeper vessels are involved, the limb becomes swollen and œdematous, presenting a tense, white appearance, with turgidity of the superficial veins. More or less pain is present, with a feeling of weight and inability to use the part.

Adhesive Phlebitis may terminate in resolution and recovery, the clot, or thrombus, becoming absorbed or broken up, and washed away by the blood-stream; or organisation of the thrombus may ensue, the vessel becoming permanently obliterated and converted into a fibrous cord. In exceptional cases, the clot may break down, and suppuration may ensue in or around the vein, "suppurative phlebitis."

For the diagnosis between this condition and lymphangitis, cf. (**502**).

2. Suppurative. *Suppurative Phlebitis* usually commences with inflammation of the tissues round the vein, the vessel itself

becoming secondarily implicated; or, it may be due to changes occurring primarily in the vein itself, *e. g.* breaking down of the clot in a case of adhesive phlebitis.

As a general rule, this affection is only met with in connection with an unhealthy state of the system, being extremely uncommon in the robust and strong.

The local symptoms are similar to those occurring in the adhesive form of phlebitis, though of a more severe type. There will be the same external evidences of inflammation spreading more or less rapidly along the course of the vessel, with, in addition, the formation of abscesses round about, and in the veins themselves. If these are opened, or burst externally, there will be a discharge of pus mingled with portions of broken-down blood-clot.

In cases of this kind, pyæmia is very liable to occur, for, portions of the clot becoming softened and broken up, may gain access into and be carried away by the blood-stream; these, becoming arrested in different parts or organs, may, if they possess infective properties, set up suppurative processes, and in this way give rise to the formation of secondary or "embolic" abscesses.

The constitutional symptoms, which attend cases of suppurative phlebitis, are generally of a severe type. Marked depression of the general system will usually be present, and in most instances, evidences of blood-poisoning sooner or later manifest themselves.

Varicose Veins.

504. *Varix, or Varicose Veins.*—A varicose, or dilated condition of the veins of the upper extremity, is rarely met with, much less frequently than in the case of the lower limbs.

When present, it is generally the result of the pres-

sure of a tumour upon one of the large venous trunks, which return the blood from the arm.

The affected veins, if superficial, become tortuous, dilated, and sacculated, so that they are plainly perceptible beneath the skin, appearing as prominent cords of a bluish colour. In cases where the obstruction is extreme, more or less œdema (**505**) of the hand and arm may be produced.

Œdema.

505. *Œdema*, or swelling of the hand and arm, due to effusion of serum into the subcutaneous tissue, is often seen. If localised and confined to one extremity it may be due to various causes, *e. g.*:

1. Obstruction to the venous circulation from mechanical causes, *e. g.* tight bandaging, tumours in the neck, axilla, or arm, &c., pressing upon the main venous trunks, and interfering with the return of blood from the upper extremity.

2. Inflammatory affections, *e. g.* erysipelas (**496**), lymphangitis (**502**), phlebitis (**503**), &c.

3. In cases of hemiplegia (**655**) slight swelling of the hand and arm of the paralysed side is often observed.

If the œdema is symmetrical, involving both upper extremities, or affecting the whole body, as in cases of general dropsy, it is generally due to some organic mischief, *e. g.* cardiac or renal disease.

In cases of Bright's disease, slight swelling of both hands (as well as of the eyelids and ankles) is often one of the early symptoms, and under these circumstances the œdema is usually not persistent, but comes and goes from time to time, constantly changing its seat.

Gangrene.

506. *Gangrene* of the arm may be produced by any of the causes described as producing the same condition in the hand (**597**).

It may commence in the arm, or be due to extension from the hand; it may be either of the dry or moist variety, most frequently of the latter, for gangrene of the arm is usually of traumatic origin, appearing in connection with some serious injury, *e. g.* severe crush or laceration, bad compound fracture, &c.

In either case the general course and symptoms will be the same as those described (**597**).

Teno-synovitis.

507. *Teno-synovitis*, or inflammation of the sheaths of the tendons, is often met with in the upper extremity, especially in the lower part of the forearm, just above the wrist, or in the hand, as the result of sprains, twists, &c.; in other cases it may occur independently of any injury in rheumatic subjects, or be due to extension of inflammation in cases of synovitis of the wrist-joint (**552**).

Any of the tendons may become involved, but those especially liable are the tendons of the supinator longus and the extensor muscles of the thumb and fingers.

This condition is characterised by more or less swelling in the course of the affected tendon, with tenderness on pressure and pain on any movement by which it is brought into action. In many cases a peculiar crackling sensation ("tenalgia crepitans") is experienced on pressing on the swelling, especially if the muscle is put into action at the same time. This symptom may cause the condition to be mistaken for a fracture (*e. g.* teno-synovitis of the tendon of the supinator longus might simulate a fracture of the lower end of the radius), but the crepitation, which is caused by the surfaces of the sheath of the tendon, roughened from fibrinous deposit, rubbing against each other, is altogether of a different character, being much finer, "silken crepitus," than

when due to the grating of the fractured ends of bone.

Suppurative Teno-synovitis, i. e. suppuration in the sheaths of the tendons, is most commonly met with in connection with the flexor tendons on the front of the wrist, as the result of extension of inflammation from a poisoned wound or abscess on the palm of the hand or finger, cf. palmar abscess (**602**), tendinous whitlow (**614**).

Under these circumstances acute inflammation leading to suppuration rapidly extends along the sheath of the tendons, beneath the annular ligament to the lower part of the forearm above the wrist, and sometimes onwards towards the elbow.

This condition is always attended by severe local symptoms, viz. extreme pain of a throbbing nature, owing to the pus being confined and bound down by the palmar fascia, annular ligament, and sheaths of the tendons, with heat, redness of the integuments, and more or less swelling, most marked above the wrist, and tending to spread upwards along the forearm. Evidences of lymphangitis (**502**) are often present; the glands about the elbow (**530**) and in the axilla (**423**) will be found to be inflamed and painful, and in some cases suppuration may ensue.

Considerable constitutional disturbance generally accompanies this condition, and blood poisoning is not unlikely to occur.

When the affection runs this course, and suppuration takes place, considerable destruction of the parts often results; the tendons slough, the wrist-joint becomes involved, and abscesses form among the muscles and tendons of the forearm.

Under these circumstances amputation of the limb

may be required; or, recovery may take place but with anchylosis of the joint, or the formation of adhesions between the tendons and their sheaths or in the surrounding parts, so that the forearm and wrist are left in a more or less deformed and stiffened condition.

Syphilitic Contraction of Biceps Muscle.

508. *Syphilitic contraction of Biceps Muscle.*—As one of the late affections of constitutional syphilis, contraction of the flexor muscles of the arm, most commonly of the Biceps, is sometimes met with.

"The movement of the forearm upon the arm begins without pain or other symptoms to become gradually less free, and as if fixed by an irresistible power, the forearm becomes flexed in an obtuse angle upon the arm to a greater or less degree, and extension becomes impossible, although further extension may be performed in some cases, while in others complete anchylosis exists. No lesion or alteration can be perceived in the size, shape, or appearance of the tissue involved. The tendon of the biceps, the muscle involved, is tense and hard as iron."*

The duration of this condition, the pathology of which is somewhat obscure, depends entirely upon its treatment; under the employment of specific remedies, it usually rapidly disappears.

Inability to raise Arm.

509. *Inability to raise the arm from the side* may be due to various causes, *e.g.*:

1. Anchylosis of shoulder-joint (**421**).
2. Paralysis of deltoid (**410**) and other muscles about the shoulder.
3. Contraction of cicatrices in axilla (**511**).
4. Affections of the axilla, or parts about the shoulder, *e.g.*: abscess, tumours (**422**), &c., interfering with the movements of the arm.

* Van Harlingen, 'Internat. Encycl. of Surgery,' vol. ii, p. 487.

5. Traumatic causes, *e.g.*: bruises, fractures, dislocations, &c., about the shoulder or upper arm.

Contraction of Elbow.

510. *A contracted or bent elbow* may be due to various causes, *e.g.*

1. Anchylosis of the elbow-joint from disease (**480**); or after injury, *e.g.* unreduced dislocations of the elbow, or fractures involving the elbow-joint.

2. Contraction of cicatrices about the front of the elbow from injury or disease (**511**).

3. Contraction of the flexor, or paralysis of the extensor muscles of the fore-arm (**638**), (**657**).

4. Any inflammatory process about the joint.

Cicatricial Contractions.

511. *Cicatricial contractions.*—After any injury accompanied by extensive destruction of the soft tissues, *e.g.* burns, lacerations, &c., or after extensive ulceration from any cause (**498**), the cicatricial tissue by which repair is effected often undergoes considerable contraction, and as a consequence great deformity may be produced; when involving the axilla, the arm may be bound down to the side; when affecting the front of the elbow, the forearm becomes bent, when affecting the back of the joint, it becomes extended, &c.

Morbid Condition of Cicatrices.

512. Cicatrices, owing to their low organisation, imperfect vascularity, and the absence from their tissue of the sebaceous and sweat-glands which lubricate and moisten the normal skin, are very liable to become the seat of various diseases and degenerations: *e.g.* they frequently break down and ulcerate, or become the seat of warty or keloid growths (**494**), less commonly of epithelioma; in some cases, owing to the implication of nerve-filaments in the cicatricial tissue, they are extremely tender, and affected with neuralgic pains.

Sinuses.

513. *Sinuses* may appear at any part of the arm

or forearm, as the result of non-closure of the cavity of an abscess (527), which has formed in this situation.

514. "*Lawn-tennis arm*," or sprain of the pronator radii teres muscle and the fascia and intermuscular septum on the inner side of the humerus from which its greater head arises, is not unfrequently met with at the present day as the result of the frequent back-stroke in tennis, whereby the forearm is brought into rapid and forcible pronation. "The condition is slight swelling with tenderness on firm pressure along the course of the pronator, and pain in bringing the muscle into action, but as a rule not otherwise. "Lawn-tennis arm."

"The symptoms soon disappear if the movements of pronation and supination are restricted. . . ."*

It has also been suggested that the injury is due to some lesion of the musculo-spiral nerve.†

* Henry Morris, 'Lancet,' 1882, vol. ii, p. 133; 'Brit. Med. Journal,' 1883, vol. ii, p. 557.

† 'Brit. Med. Journal,' 1883, vol. ii., p. 1168.

CHAPTER XLIV

TUMOURS OF ARM AND FOREARM

Tumours or Swellings of Arm and Forearm.

515. The tumours or swellings most frequently met with in the arm and forearm (excluding those in the axillary region (**422**), may be divided into two classes, viz., 1, those connected with the soft tissues; 2, those connected with the bones.

I. *Tumours connected with the soft tissues* may be arranged as follows:—

- 1. Occurring at any part of the Arm or Forearm
  - Aneurism (516, 518).
  - Lipoma (519).
  - Fibroma or Sarcoma (520).
  - Molluscum Fibrosum (521).
  - Molluscum Contagiosum (522).
  - Neuroma (528).
  - Sebaceous Cysts (523).
  - Simple Cysts (524).
  - Gummata (525).
  - Abscess (527).
  - Hæmatoma (425).
  - Nævus (526).
  - Warts (611), Moles (Pt. I, 5).
  - Subcutaneous Rheumatic Nodules (532).
- 2. Occurring at middle of Upper Arm . . . .
  - Aneurism of Brachial Artery (516).
  - Contracted Biceps after rupture of its Long Tendon (400).
- 3. Occurring about Elbow . .
  - In Front
    - Aneurism of Brachial Artery (516).
    - Arterio-venous Aneurism (517).
    - Adenitis (530).
  - Behind
    - Bursitis (531).
    - Ganglion (533).
  - Above and Internal
    - Adenitis (530).

4. Occurring about lower part of Forearm and Wrist.	In front.	Compound Ganglion (533). Abscess (527). Aneurism of Radial or Ulnar Artery (518).
	Behind or Laterally	Simple Ganglion (533).

II. *The tumours proper usually met with in connection with the bones* of the arm or forearm are as follows:—

Upper Extremity of Humerus	Exostosis (460). Central Sarcoma (461).
Shaft of Humerus	Periosteal Sarcoma (461).
Lower Extremity of Humerus	Exostosis (460) (Central Sarcoma rare).
Upper Extremity of Radius or Ulna	Exostosis (460) (Central Sarcoma rare).
Shaft of Radius or Ulna	Periosteal Sarcoma (461).
Lower Extremity of Radius or Ulna	Exostosis (460). Central Sarcoma (461).

Enlargements or thickenings of the extremities or shafts of these bones due to simple inflammatory cause are met with in various conditions, viz.:

Of Humerus	Upper or Lower Extremity, cf. Table (442). Shaft, cf. Table (443).
Of Radius or Ulna	Upper or Lower Extremity, cf. Table (538). Shaft, cf. Table (539).

516. *Aneurism of the Brachial Artery* is of rare occurrence, and when present is almost invariably the result of direct injury, *e.g.* a punctured wound involving the vessel; under these circumstances, an aneurism may form in one of two ways. Aneurism of Brachial Artery.

1. When the external wound is of small size or becomes closed by pressure, extravasation of blood may take place into the tissues in the neighbourhood of the puncture in the vessel; the effused blood may then become surrounded and limited by a wall of lymph or plastic matter which forms a distinct sac; this subsequently becomes strengthened by deposits of fibrin from the blood, and in this way a cavity is formed

communicating with the vessel and giving rise to a tumour which presents all the symptoms of aneurism.

2. In other cases, the external wound, and also that in the vessel, becomes closed on the application of pressure, and no hæmorrhage takes place; after a time, however, the cicatricial tissue by which the wound in the vessel was closed, gradually yields under the force of the blood-stream, and expands so as to form the sac of an aneurism.

Under both these circumstances, the sac of the aneurism will be formed, not by any of the coats of the vessel, but simply by cicatricial tissue and the surrounding soft structures thickened and condensed by inflammatory action.

The general symptoms will be the same as those described (Pt. I. **259**) (**426**) and in many cases the scar of the external wound will be perceptible over or in the neighbourhood of the aneurism.

Arterio-venous Aneurism.

517. *Arterio-venous Aneurism of Brachial Artery.*—As the result of a punctured wound of the brachial artery in bleeding from the basilic vein, or from any other injury when both vessels are wounded, the brachial artery at the bend of the elbow, or just above, may become the seat of Arterio-venous Aneurism.

Arterio-venous Aneurism is the term applied to an abnormal communication between an artery and a vein, the result either of injury or disease; it comprises two different varieties, viz.

Aneurismal Varix, when the artery and vein directly communicate.

Varicose Aneurism, when the artery and vein do not directly communicate, but an aneurismal sac is formed between the two, into which the blood passes after leaving the artery and before entering the vein.

In *Aneurismal Varix* of the brachial artery and basilic vein, the latter vessel, becoming dilated from the arterial impulse, is converted into a soft, oblong, somewhat irregular, compressible swelling, the skin covering which is usually thinned and of a bluish colour; the veins generally about the bend of the elbow are somewhat dilated and tortuous; the swelling exhibits distinct pulsation, but not of the characteristic expansile nature peculiar to a true aneurism; on auscultation a loud rasping bruit can be heard; the artery above the communication is usually dilated, while below it is somewhat contracted; if the brachial artery is compressed above the swelling, the pulsation will cease, and the tumour can be partially emptied of blood; if the arm is allowed to hang down, the symptoms are usually intensified. In many cases, there is a loss of muscular power, with diminution of temperature in the hand and forearm, and the pulse in the radial artery is considerably weakened. 1. Aneurismal Varix.

In *Varicose Aneurism*, the symptoms are much the same, but there is, in addition, the presence of a distinct pulsating tumour, and on auscultation the ear will detect the blowing sound of aneurism as well as the rasping bruit characteristic of aneurismal varix. 2. Varicose Aneurism.

518. *Aneurisms of the Radial or Ulnar Artery* are of extremely rare occurrence, except as the result of injury, *e. g.* a punctured wound involving either vessel; under these circumstances, a traumatic aneurism may form at the seat of injury in the way described (**516**), at any point in the course of the vessels, *e. g.* in the upper or middle of the forearm, or just above or at the wrist; the general symptoms will be the same as those described (**426**). Aneurism of Radial and Ulnar Artery.

519. *Lipomata*, or Fatty tumours (**404**), are some- Lipomata.

times met with on the arm and forearm, though it is somewhat exceptional to find them situated at a lower point than the insertion of the deltoid muscle.

Sarcomata.

520. *Sarcomata* or *Fibromata*, springing from the subcutaneous tissue or connected with the muscles themselves, may occur at any point on the arm or forearm, presenting characters similar to those described (403).

In rare instances, sarcoma may attack the skin of the extremities or the body generally, appearing in the form of small, roundish, firm nodules, usually multiple, varying in size from a shot to a hazel-nut, and very liable to ulcerate after a time.

Under these circumstances, "*Sarcoma cutis*" is usually secondary to the occurrence of the disease in some other situation.

Molluscum Fibrosum.

521. *Molluscum Fibrosum*, or Soft Fibromata, *i. e.* small tumours consisting of the connective tissue elements of the skin and springing from the superficial layers of the corium, are often met with on the upper extremity ; they usually appear as small tumours, varying considerably in size, at first sessile, but as they enlarge becoming pedunculated and pyriform in shape ; they are usually multiple, and of soft consistence, being covered by normal skin, and giving rise to no trouble or inconvenience, except from the deformity they produce.

Molluscum Contagiosum.

522. *Molluscum Contagiosum* is sometimes seen on the extremities, especially of children, presenting characters similar to those described (Pt. I, 41).

Sebaceous cysts.

523. *Sebaceous Cysts* are not of very common occurrence on the upper extremity, but when present they resemble those met with on the scalp (Pt. I, 6)).

Simple cysts.

524. *Simple Cysts* or *Cystic Tumours*, containing a

thin, serous or sanious fluid are sometimes met with about the extremities; in rare instances, hydatid cysts (Pt. I, 240) also occur in the same situation.

525. *Gummatous deposits* in the subcutaneous tissue or substance of the muscles themselves are often met with, presenting features similar to those described (**406**); if they break down and ulcerate, a deep syphilitic ulcer (**499**) will be produced. Gumma'a.

526. *Nævi* of the capillary, venous or mixed variety (Pt. I, 4) are sometimes met with on the upper extremity, though they are not of very frequent occurrence. Nævi.

Degenerated Nævi.—As the result of inflammatory changes occurring in nævi, which have existed in early life, spontaneous cure may take place, and the nævus may disappear leaving the skin simply pigmented, or presenting a glistening, cicatricial-like, atrophied appearance.

In other cases, the integuments remain considerably thickened and indurated, the vascular growth having been transformed into dense fibroid tissue, which sometimes contains small cysts in its interior.

Sometimes a considerable portion of the integument of one of the extremities is found affected in one or other of these ways, as the result of degeneration of a nævus.

527. *Abscesses* may form at any part of the arm or forearm as the result of injury, or, they may occur without any apparent cause, often simply in connection with a low state of health, *e. g.* in cases of struma, small abscesses frequently form in the subcutaneous connective tissue; they may appear in connection with lymphangitis (**502**), erysipelas (**496**), suppurative phlebitis (**503**), or be due to the breaking down of a gumma (**525**); or occur in connection with caries (**449**), Abscess.

or necrosis (**448**) of the humerus, radius, or ulna; cf. also periosteal abscess (**445**).

When appearing at the upper part of the arm, near the insertion of the deltoid, they are often due to disease of the shoulder-joint (**408**), the pus burrowing downwards and pointing in this situation.

When in the neighbourhood of the elbow, they may be due to bursitis (**531**), adenitis (**530**), or disease of the joint itself (**468**). When in the neighbourhood of the wrist, they may be due to disease of the joint (**551**); and when in front of the wrist, just above the annular ligament, they are often due to suppuration in the great synovial sac which invests the flexor tendons (**602**).

Neuroma.

528. The term, *neuroma*, is applied generally to any form of tumour appearing in connection with a nerve, and includes three different varieties of growth, viz. true neuroma, nerve-fibroma, and painful subcutaneous tubercle.

1. True Neuroma.

1. *True neuroma*, *i. e.* a tumour consisting entirely of nerve-tissue, is of extremely rare occurrence; it is attended by extreme pain, and when present is not to be distinguished clinically from the other growths which belong to the same class.

2. Nerve-fibroma.

2. *Nerve-fibroma*, *neuro-fibroma*, or *fibrous neuroma*, *i.e.* a tumour consisting of fibrous tissue, or of fibrous tissue mixed with spindle-cells, is the form of growth most commonly found affecting the trunk of a nerve.

It may be situated upon or within the sheath of the nerve, and in the latter case, the nerve fibrillæ are in some instances separated from one another by the growth, in others incorporated with it.

Nerve-fibromata usually appear as firm, well-defined

tumours, with smooth outlines, situated in the course of a cutaneous nerve, and varying in size from a pin's head or a pea to a walnut; in exceptional cases they may attain considerable dimensions, becoming as large as the head of an adult.

In shape, they are round, oval, or fusiform, their long axis corresponding with the direction of the nerve with which they are connected; they are generally of slow growth, lying beneath the skin which is moveable over them.

The tumours themselves are freely moveable in a direction lateral to the course of the nerve on which they are situated, but they cannot be moved in the direction of its axis.

They are very frequently multiple, especially in the different branches of the same nerve, and in some cases the cutaneous nerves generally throughout the body, especially those of the extremities, are affected by them; under these circumstances, viz. when multiple, they are as a rule unattended by any pain; in these two respects they differ from the painful subcutaneous tubercle, which is usually single, and extremely painful.

Multiple nerve-fibromata are more commonly met with in males than females, and as a rule give rise to little inconvenience, except such as may arise from their number and size.

They may occur at any point in the course of one or more of the cutaneous nerves of the arm or fore arm.

3. *Painful subcutaneous tubercle* is the term applied to a similar form of tumour, differing however in the following important particulars:—(1.) It is always single. (2.) It is always extremely painful, especially

3. Painful Subcutaneous Tubercle.

upon pressure. (3.) In many cases there is no obvious connection with any nerve trunk.

Pathologically its structure is identical with that of a nerve-fibroma; the tumour, which is rarely larger than a pea, is usually situated in the subcutaneous tissue.

The pain, which is always a very prominent symptom, and of a neuralgic or lancinating nature, extending from the tumour up and down the limb, is not constant but comes on in paroxysms, sometimes without any cause, in other cases when the tumour, which is usually extremely sensitive and very tender on pressure, has been accidentally touched. It is most commonly met with in females, its favourite situations in the upper extremity being about the elbow, lower part of the forearm, and palm of the hand (608).

Traumatic Neuroma.

529. A nerve-fibroma may form at the seat of injury after wound or division of one of the nerves of the arm, and under these circumstances the symptoms are often similar to those met with in the case of painful subcutaneous tubercle (528).

After amputation of the arm, the ends of the divided nerves sometimes become enlarged and bulbous, and extreme pain and tenderness are under these circumstances often present in the stump, especially if the end of the nerve is involved in the cicatrix or pressed upon by the end of the bone.

Adenitis

530. The small lymphatic gland situated just above the internal condyle of the humerus, in front of the intermuscular septum, or those occasionally found in front of the elbow,* often becomes inflamed and under

* There are occasionally two or three in front of the elbow, and or two above the internal condyle of the humerus, near the basilic vein. 'Gray's Anatomy,' 9th edition, p. 457.

these circumstances, enlarged, painful, tender to the touch, and plainly perceptible beneath the skin, in cases of lymphangitis (502) of the forearm from any cause, *e. g.* a poisoned wound on the hand or forearm, whitlow, &c.

Under proper treatment, or if the cause of irritation is removed, the inflammation may subside, or it may go on to suppuration and the formation of an abscess.

In cases of digital chancre (617), the same glands (as well as those in the axilla) are usually found enlarged and indurated.

(In cases of malignant disease, *e. g.* epithelioma of the hand or forearm, &c., the same glands may become the seat of secondary deposits; cf. axillary glands (423).)

Inflammation of Bursæ about Elbow.

531. Inflammation of the subcutaneous bursa situated over the olecranon process is very frequently met with; less frequently the deep bursa which lies beneath the triceps tendon, between it and the humerus, is involved; at other times the bursæ which are situated over either condyle of the humerus, beneath the brachialis anticus, or between the tubercle of the radius and the tendon of the biceps, are affected.

Over Olecranon.

Inflammation of the bursa over the olecranon, owing to its superficial position and constant exposure to injury, is of very common occurrence.

When of an acute nature, it is generally the result of some injury, *e. g.* a blow or fall on the elbow, or a wound involving the bursa; when of a subacute or chronic character, it is usually due to some prolonged or constantly recurring irritation, *e. g.* pressure or friction, as in the so-called "student's" or "miner's" elbow.

The symptoms of this condition, if the inflammation

is at all *acute*, are as follows: a localised, tense, fluctuating swelling, about the size of a walnut, appears situated directly over the olecranon process; the skin covering it will be hot and reddened; tenderness will be present on pressure, and pain will be felt in the part, especially on any attempt to bend the elbow.

Under proper treatment the inflammation may subside, or suppuration may ensue; under these circumstances the inflammatory symptoms will increase in severity; the surrounding tissues become swollen and œdematous; the redness is more diffused, spreading round the elbow and up and down the arm; the local increase of temperature is more marked and the pain is increased.

If left to itself, the pus will either discharge externally, or the bursa giving way subcutaneously, it may make its way into the surrounding tissues; under the latter circumstances the elbow-joint may become involved, and not unfrequently necrosis of the surface of the olecranon will result; after the bursting of the abscess, sinuses often form, situated over the back of the joint, discharging pus and in some cases leading down to necrosed bone.

When the inflammation is of a more *chronic* character, a similar fluctuating swelling will appear, but unattended by any, or only by very slight, inflammatory symptoms.

In some cases the walls of the bursa become considerably thickened from deposits of fibrin on their inner surface, and in cases of long standing its cavity may become almost or completely obliterated, the sac of the bursa becoming under the latter circumstances converted into a solid tumour; in other instances, the bursa contains within its interior, numerous, small,

loose bodies, like melon-seeds, consisting of masses of amorphous fibrin.

Inflammation of the bursa can be distinguished from synovitis of the elbow-joint by the difference in the shape of the swelling and its more superficial nature (**469**).

Beneath Triceps Tendon.

Inflammation of the Bursa beneath the Triceps Tendon, which sometimes communicates with the elbow-joint, is much more rarely met with.

When no communication with the joint exists, the inflamed bursa will present itself as a small, tense, fluctuating swelling, which can be felt on either side of the Triceps tendon: the depressions, however, which are normally present in these situations and also between the head of the radius and the external condyle of the humerus will still remain; the tendon itself will be rendered more prominent than usual: pain will be felt, especially on any attempt to flex or straighten the forearm, owing to the bursa being then compressed between the tendon and the bone.

If the bursa communicates with the joint, the inflammation will probably extend into its interior: the general symptoms of synovitis (**469**) will be present, and all the above depressions will become obliterated.

Subcutaneous Rheumatic Nodules.

532. *Subcutaneous Rheumatic Nodules** is the term applied to multiple, small, subcutaneous growths, consisting of fibrous tissues, and occurring most commonly in young subjects, especially females, who have suffered from acute rheumatism, or who are the subjects of chorea, which is of rheumatic origin.

The nodules, which vary in size from a pin's head to a hazel-nut, are usually freely moveable beneath the skin: in some cases they are painful and tender on

* 'Trans. Internat. Med. Congress,' 1881, vol. iv, p. 116, Barlow and Warner. 'Brit. Med. Journal,' 1883, vol. i, p. 623.

pressure, in others both these symptoms are absent; they may occur singly or in groups, and are often symmetrical: they are usually of firm consistence, and are often found to be connected with the deep fascia or sheaths of the tendon.

They are generally situated over bony prominences, especially those which are most exposed to friction and pressure, and in the upper extremity are often found about the elbow (over the olecranon and condyles), knuckles, backs of the hands, and phalangeal joints.

The nodules are not, as a rule, permanent, but come and go, being often present for a few weeks or months and then disappearing.

In many cases the subjects of this affection suffer from heart disease, generally of a severe and progressive form, and it has been suggested that the little nodules or outgrowths of fibrous tissue are analogous to the vegetations so often found on the cardiac valves.

When occurring in adults, these little growths are sometimes more permanent, being often present for several years, and under these circumstances they are sometimes found to have connection with the skin and periosteum.*

Ganglion.

533. *Ganglion* is the term applied to a cystic tumour developed in connection with the sheath of a tendon; two varieties are described, viz. simple and compound; the former, the most common variety, occurring as an encysted, the latter, as a more or less diffused swelling.

1. Simple.

1. *Simple Ganglion* is most frequently met with on the posterior or lateral aspect of the wrist, appearing in connection with one of the extensor tendons (especially those of the thumb) in these situations.

It presents itself as a small, globular, well-defined,

* Duckworth, 'Lancet,' 1883, vol. i, p. 778.

Ganglion.

elastic swelling, in some cases tense, in others soft and fluctuating, forming a distinct prominence beneath the skin which is freely moveable over it, and varying in size from a cherry-stone to a walnut, or even larger.

As a general rule its presence is not attended by much or any pain; there is simply a sense of weakness in the wrist, so that the movements of the hand are more or less impaired.

Much more rarely a simple ganglion may appear in connection with the flexor tendons in front of the wrists, or on the palm (**607**).

The contents of the cyst, which is generally unilocular or single, consist in most cases of a thick, clear, jelly-like fluid; in other instances, the contained fluid is thin and of a yellowish colour.

As regards the mode of production of ganglia, it appears probable that they may form in several different ways.

In some cases they appear to be due to partial hernia-like protrusions or bulgings of the sheath of a tendon and its synovial lining, so that a little pouch or sac is formed, which at first communicates with the sheath of the tendon; in other cases the swelling appears to be due to a hernial protrusion of the synovial lining through an opening or slit in the sheath.

In both instances the communication between the cyst and the sheath becomes in most cases soon obliterated; occasionally it may remain patent, and under these circumstances the tumour is more or less completely reducible, its fluid contents being capable of being pushed back into the interior of the sheath.

When forming over a joint, *e.g.* the wrist, elbow, knee, or ankle, the tumour may be due to a hernial protrusion of the articular synovial membrane through

a rent or opening in the capsule, and under these circumstances as long as the communication (which often takes the form of a long narrow pedicle) is patent, the contents of the ganglion may be reduced into the interior of the joint.

In many cases a ganglion appears somewhat suddenly as the result of some injury, *e.g.* a sprain or twist, &c.; when occurring under these circumstances on the back of the wrist, a simple ganglion is liable to be mistaken for a dislocation of one of the individual bones of the carpus (549), but the soft and fluctuating nature of the swelling, its shape, the free mobility of the wrist-joint, to say nothing of the extreme rarity of dislocation, will usually point to the true nature of the case.

2. Compound.

2. *Compound ganglion* is usually met with on the front of the forearm just above the wrist and in the palm of the hand; under these circumstances it is due to dilatation of the great synovial sheath,* which surrounds the flexor tendons of the fingers as they pass beneath the anterior annular ligament.

It presents itself as a swelling which, taking the shape of the dilated synovial sheath, projects above and below the annular ligament, *i.e.* on the palmar surface of the hand and front of the lower part of the forearm just above the wrist; consequently a kind of

* The great synovial sheath beneath the anterior annular ligament, common to the flexor tendons of the fingers (tendons of the flexor profundus and sublimis digitorum), extends from the middle of the palm of the hand to about one and a half inches above the annular ligament; it communicates with the digital synovial sheaths of the flexor tendons of the thumb and little finger, not with those of the 2nd, 3rd, and 4th fingers, a point of some practical importance in the case of compound ganglion and tendinous whitlow (614).

Ganglion.

double or bisacculated tumour is formed, separated by a constriction which corresponds with the anterior annular ligament.

The contents of the tumour consist of a clear yellowish fluid, usually thinner than in simple ganglion; and in many instances it contains numerous white bodies resembling melon-seeds or grains of rice, which are entirely without organisation, consisting simply of amorphous fibrin.

On making alternate pressure on the swelling above and below the annular ligament, fluctuation can be readily detected, and when the "melon-seed" bodies are present, a characteristic crepitation or crackling is communicated to the touch.

In many cases the fingers are more or less flexed into the palm and cannot be straightened, so that the function of the hand is much interfered with.

Owing to the fact that the great synovial sheath communicates with the sheaths of the flexor tendons of the thumb and little finger, the swelling may extend along the palmar surface of these digits, causing them to appear much swollen and deformed, so that they cannot be completely flexed.

When involving only a single tendon, *e. g.* one of the extensor tendons on the back of the wrist or dorsum of the hand, a compound ganglion usually presents itself as an irregular fluctuating swelling following the course of the tendon; under these circumstances the swelling may be due to a general irregular dilatation of the sheath, or to a protrusion of the synovial lining through several openings in it, or to a combination of both these conditions.

CHAPTER XLV

FRACTURES OF RADIUS AND ULNA

- Fracture of Radius and Ulna.
  - Radius
    - Upper extremity—Neck.
    - Shaft.
    - Lower extremity—Colles' fracture.
  - Ulna
    - Upper extremity
      - Olecranon.
      - Coronoid process.
    - Shaft.
    - Lower extremity.
  - Radius and Ulna—Upper, middle, or lower third.

Fracture of Radius and Ulna.

534. Fractures of one or both of the bones of the forearm are of very frequent occurrence.

Radius alone.

535. *Fracture of the Radius* may take place through its neck, shaft, or lower end, the latter situation being the most common.

1. Neck.

1. *Neck.*—Fracture of the neck of the radius is a somewhat uncommon accident, and one that is often difficult of detection owing to the fact that very little displacement of the fragments is usually present, the seat of injury being surrounded by a thick layer of muscles. The movements of the forearm, especially supination and pronation, are interfered with: on placing the finger over the seat of fracture and rotating the hand, crepitus will be perceived, and unless the fragments are interlocked, the head of the radius will not rotate with the shaft of the bone.

2. Shaft.

2. *Shaft.*—Fracture through the shaft of the radius is more frequently met with than fracture of the ulna alone, owing to the fact that being situated on the outer aspect of the limb, it is more exposed to direct violence;

also on account of its more direct connection with the wrist, and also because its shaft is not so strong as that of the ulna.

The usual seat of fracture is about its middle, and it may occur from direct violence or from a fall upon the hand. The upper fragment is drawn upwards by the Biceps, and inwards by the Pronator Radii Teres into a position midway between pronation and supination. The lower fragment is drawn inwards towards the ulna by the Pronator Quadratus, and thrown into a state of pronation.

The symptoms are usually well marked; a prominence is formed on the front of the upper part of the forearm by the upper fragment; there is a depression at the seat of fracture, both ends being drawn inwards towards the ulna.

There is loss of power of pronation and supination, along with abnormal mobility, and crepitus is produced on pressing the fragments together or on rotating the hand.

3. *Lower extremity.*—Fracture of the lower end of the radius is generally known as "*Colles' fracture,*" after the name of the celebrated Dublin surgeon who was the first to accurately describe it.

3. Lower extremity. Colles' fracture.

It is generally the result of a fall upon the palm of the hand, when the arm and forearm are extended.

Though met with at all ages and in both sexes, it most frequently occurs after middle life, and especially in females.

The seat of fracture is usually $\frac{1}{2}$-inch to $1\frac{1}{2}$ inches above the articular surface of the radius, just at the weakest portion of the bone, *i.e.* where the shaft commences to expand into the broad articular extremity, composed of cancellous tissue, covered with a compact

layer of bone much thinner than that of the shaft itself.

The line of fracture is generally transverse, or it may be oblique from side to side; in some cases there is comminution of the lower fragment, and not unfrequently the fracture is impacted, the compact tissue of the shaft being driven firmly into the cancellous tissue of the lower fragment.

The amount of displacement of the broken fragments varies; in some cases scarcely any is present; more commonly the displacement is considerable, so that a very characteristic deformity is usually produced, viz.:

The *lower fragment*, carrying with it the hand, is driven upwards and backwards behind the upper fragment, by the direction of the force and the combined action of the supinator longus and the flexors and extensors of the thumb and carpus, so that a well-marked prominence is produced on the back of the wrist with a deep depression above it.

The *upper fragment* projects forward, often lacerating the substance of the Pronator Quadratus, and is drawn by this muscle into close contact with the lower end of the ulna, causing a projection on the anterior surface of the forearm immediately above the wrist from the flexor tendons being thrust forwards.

There is considerable difference of opinion as to whether the fracture is generally impacted or not; in cases where the deformity is permanent and cannot be reduced, impaction of the upper into the lower fragment is probably present; in cases where the deformity is readily reducible, it is no doubt simply due to muscular action.

Symptoms.—Local pain and swelling about the wrist-joint; the movements of the wrist are impaired, prona-

tion and supination being impossible. On viewing the limb sideways, its posterior surface will be seen to present a distinct projection (formed by the lower fragment) just above the wrist; a little higher up, about 1½ inches above the wrist, a distinct depression will be evident; the anterior surface of the limb will present a hollow or depression just above the wrist, corresponding in position with the dorsal projection, and most marked on its radial margin; a little higher up, and corresponding with the dorsal depression, a distinct projection is seen, formed by the upper fragment pushing before it the flexor tendons.

On viewing the back of the limb, it will be seen that the hand is drawn over to the radial side, so that its ulnar border is somewhat convex, the styloid process of the ulna being rendered unusually prominent, while its radial border, which is somewhat shortened, is slightly concave.

When the fragments are not impacted, crepitus can be readily obtained on moving the hand; when, however, impaction is present, crepitus is absent, or cannot be obtained unless the fragments are forcibly moved.

In the non-impacted fracture, the deformity can usually be readily reduced, and the bones brought into good position; but in the impacted form, the deformity is permanent, unless the fragments are forcibly loosened and the bones brought into apposition.

In most cases, more or less stiffness will remain for a considerable time, even in instances where reduction has been effected.

For the diagnosis of this injury from dislocation of the wrist, cf. (**547**), from tenosynovitis of the tendons about the wrist, cf. (**507**).

Ulna alone.

536. *Fracture of the Ulna* most commonly occurs

The line of fracture is usually transverse, both bones being broken on the same level, or nearly so.

The upper fragments are drawn forwards by the action of the biceps, pronator radii teres, and brachialis anticus, the radius being at the same time somewhat approximated to the ulna.

The lower fragments are drawn together by the pronator quadratus, and upwards either in front of or behind the upper fragments by the flexor and extensor muscles.

Symptoms.—There is more or less shortening of the forearm, with in many cases considerable deformity, the lower fragments, which usually overlap the upper, forming a projection on either the anterior or posterior surface of the limb; crepitus can be readily detected and abnormal mobility is also present.

In infants and young children the so-called "green-stick" or incomplete fracture of the radius and ulna is often produced.

When the fracture is situated just above the wrist-joint, the appearance produced may resemble a dislocation of this articulation; for the diagnosis between the two injuries, cf. (**547**).

CHAPTER XLVI

AFFECTIONS OF RADIUS AND ULNA

Enlargement of extremities of Radius or Ulna.

538. An enlargement or thickening of either extremity of the radius or ulna may be due to the same causes as in the case of the humerus, cf. Table (**442**).

Enlargement of shaft of Radius or Ulna.

539. An enlargement or swelling of the shaft of the radius or ulna may be due to the same causes as in the case of the humerus, cf. Table (**443**).

Rickets.

540. *Rickets.*—In cases of rickets, changes identical with those occurring in the humerus (**451**) are met with in the radius and ulna; both bones are sometimes found twisted and bent outwards, the result partly of muscular action, partly of the habit children have of supporting themselves, when sitting or kneeling, upon their hands or elbows.

Their articular ends, more especially the lower ones, are often found enlarged and thickened, presenting a kind of bulbous appearance; in many cases, this enlargement of the lower epiphyses, which is usually more marked in the radius than the ulna, is so great that a characteristic "double-jointed" appearance is given to the wrist.

Tumours.

541. *Tumours.*—As in the case of the humerus, the radius and ulna may become the seat of exostoses and sarcomatous growths.

Exostosis.

542. *Exostosis.*—In exceptional cases, either extremity of the radius or ulna may become the seat of exostoses,

which present characters similar to those described in the case of the humerus (460).

Sarcomata.

543. *Sarcomata* of the central or periosteal variety more frequently attack these bones.

1. Central.

Central sarcomata almost invariably attack the lower extremities of the radius and ulna, it being somewhat exceptional to find tumours of this nature originating in the upper epiphyses of either of these bones.

As a general rule, they are not of a very malignant nature, and, if removed early, non-recurrence may be looked for.

For their general course and symptoms, cf. (461).

2. Periosteal.

Periosteal sarcomata usually attack the shafts or upper portions of the bones; their course is similar to that described (461), but, as a general rule, they are less malignant than similar tumours of the humerus, for it is found that a sarcomatous tumour connected with a bone situated at a distance from the trunk is not so malignant as one springing from a bone nearer to it.

Other affections.

544. The radius and ulna may become affected with periostitis (445), (446); osteomyelitis (447); chronic abscess (450); caries (449); necrosis (448); mollities ossium (452); ostitis deformans (453); hypertrophy (455); atrophy (454); elongation (456); shortening (457), and in each instance the general symptoms will be the same as in the case of the humerus.

Increased curvature.

545. *Increased curvature* of the radius and ulna may be due to the same causes as in the case of the humerus (458).

CHAPTER XLVII

DISLOCATIONS OF WRIST

Dislocations of wrist
- Radius from ulna.
- Carpal bones from ulna and radius.
- Second row of carpal bones from the first.
- Individual carpal bones.
- Metacarpal bones from carpal.

Dislocations of the Wrist are of rare occurrence; five different varieties are described.

546. *Dislocation of the lower end of the Radius from the Ulna*, or as it is sometimes termed, *dislocation of the Ulna from the Radius*, is occasionally met with as the result of violent and excessive pronation or supination of the hand, *e. g.* in severe twists or wrenches. It is frequently seen in a slight degree in washerwomen, as the result of constantly wringing out clothes ("washerwoman's wrist"). Lower end of Radius from Ulna.

The displacement may take place in either a forward or a backward direction.

1. *Forwards.*—In this, the most common form, the lower extremity of the radius, carrying with it the hand, is displaced forwards; the lower end of the ulna, especially its styloid process, is therefore rendered unduly prominent, projecting backwards beneath the skin. 1. Forwards.

2. *Backwards.*—In this form, the position of the bones is reversed, the lower end of the radius projecting unduly on the back of the wrist. Both these disloca- 2. Backwards.

reduced, but

maintaining

of the Carpus

rare occurrence

usually the result of a fall upon the hand

either a fracture of a metacarpal

latter being most common.

— In the dislocation backwards the

with it the hand forms a distinct

dorsal surface of the lower end of

the articular extremities of which

tion on the palmar aspect of the

presenting, as it does a convex and

liable to be confounded with a

radius (535 . with fracture

just above the wrist-joint (Barton's

fracture). It must be

that in this injury crepitus

are present, unless the fracture

ity, which is much less marked

margin of the wrist than is

from the external process of the radius the

displaced upwards and back-

and preserving its normal

here is undue prominence of

ulna, and the hand is drawn

firmly impacted the latter

only with great difficulty

Radius and Ulna

distinguished by the fact that

is present along with a fracture; the relationship of

Carpus from Radius and Ulna.

styloid processes of the radius and ulna is altered, as they are carried backwards with the hand, consequently shortening is present on measuring from the condyles of the humerus to either of these bony points; the deformity is easily reducible, but returns when extension is discontinued; the dorsal and palmar projections are rough, sharp, and irregular, instead of being smooth and rounded, as when formed by the articular surfaces of the radius, ulna, and carpus.

2. Forwards.

2. *Forwards.*—In this variety, which is of much rarer occurrence than the last, the carpus forms a projection on the palmar surface of the lower ends of the radius and ulna, the articular extremities of which form another prominence on the dorsal aspect of the wrist.

Second row of Carpal Bones from the first.

548. *Dislocation of the Second row of Carpal bones from the First* in a backward direction is described, but it is an injury of extremely rare occurrence.

Individual Carpal Bones.

549. *Dislocations of the individual Carpal Bones* are also of rare occurrence. The bone most frequently displaced is the Os Magnum in a direction backwards; in this injury, the result generally of forcible flexion of the wrist, as in a fall upon the back of the hand, the head of the bone forms a distinct prominence on the back of the wrist, just above the base of the third metacarpal bone; reduction can generally be readily effected, but considerable difficulty is experienced in retaining the bone in position.

In other cases, the semilunar, pisiform, or remaining carpal bones may become dislocated.

A simple ganglion, when forming on the back of the wrist, as the result of injury, *e. g.* a sprain, is liable to be mistaken for a dislocation of one of the carpal bones, cf. (533).

Metacarpal Bones from Carpal.

550. *Dislocations of the Metacarpal Bones from the*

Carpal.—Dislocations of one or more of the metacarpal bones from the carpus are extremely rare. The metacarpal bone of the thumb is the one most commonly involved, and the displacement may take place in a backward or forward direction, the base of the metacarpal bone being thrown backward so as to form a distinct prominence on either the palmar or dorsal surface of the trapezium as the case may be.

In cases where the entire metacarpus is displaced, an extremely rare injury, the carpal bones form a convex projection on the dorsal or palmar surface of the metacarpal, as the case may be, which contrasts with the concave projection formed by the lower ends of the radius and ulna, in dislocation of the carpus from these bones (**547**).

CHAPTER XLVIII

DISEASES OF THE WRIST-JOINT

551. The wrist-joint is subject to the same forms of disease as those described as attacking the elbow (**468**). Inflammation may commence in either the synovial membranes or the bones entering into its formation, and owing to the complicated arrangement of the former structures between and around the carpal bones, all parts of the joint usually become rapidly involved. Diseases of Wrist Joint.

If left to itself, the hand tends to assume the prone and flexed position; consequently the posterior ligaments of the joint are put on the stretch, and in many cases a partial dislocation backward of the ulna is produced.

552. In *Serous Synovitis*, the general symptoms will be the same as those described (**469**). Serous Synovitis.

Round the back of the joint there runs a bracelet-like swelling, which is more marked laterally on either side of the extensors of the fingers, and also in the depression which is normally present between the extensores primi and secundi internodii pollicis; in front also at either side, it is perceptible.*

In many cases the sheaths of the flexor and extensor tendons passing over the joint become involved from extension of inflammation, or they may become the seat of a primary inflammation without any implication of the joint itself (**507**).

Under these circumstances, the swelling which is due

* Barwell, 'Diseases of Joints,' p. 48.

to effusion into their sheaths is generally more superficial: if involving the extensor tendons, it is "generally bi- or trifurcated and fusiform, the long axis being parallel with that of the arm, not as in synovitis at right angles with it;" if involving the flexor tendons, "enlargement of the large tendinous sheath produces swelling in the palm and wrist, a bi-sacculated swelling."*

Suppurative Synovitis.

553. In *Suppurative Synovitis* the general symptoms will be similar to those described (**470**).

Pulpy Synovitis.

554. In *Pulpy disease of the Synovial Membrane*, the general symptoms will be the same as those described (**471**); the shape of the swelling, which is most marked on the posterior aspect of the joint, will be the same as that met with in serous synovitis (**552**), its long axis running across the wrist; owing to the wasting of the muscles of the hand and lower part of the forearm, which after a time results, the wrist-joint often presents a characteristic bulbous appearance.

Articular Ostitis.

555. Inflammation of the bones entering into the formation of the wrist (*e.g.* lower ends of radius and ulna, carpal bones, and bases of the metacarpal bones), leading to caries or necrosis, is frequently met with; ulceration of the cartilage covering their articular surfaces readily occurs, suppuration ensues and abscess forms within and around the joint.

The general symptoms will be the same as those described when the ends of the bones entering into the formation of the elbow (**472**) or shoulder-joints (**414**) are similarly affected.

Syphilitic Epiphysitis.

556. In children, the subjects of congenital syphilis, similar changes to those described as occurring about the elbow (**475**) and shoulder (**416**), are often met with

* Barwell, 'Diseases of Joints,' p. 48.

in the lower extremities of the radius and ulna, leading to thickening of the bones just above the wrist, with loss of power, "pseudo-paralysis," in the hand and lower part of the forearm.

Rheumatic Arthritis.

557. The wrist is not unfrequently the seat of *Chronic Rheumatic Arthritis* (**417**), and the deformity produced is usually characteristic, the lower ends of the radius and ulna becoming enlarged from deposits of osteophytes and projecting unduly backwards, more especially the ulna, so that a kind of pseudo-dislocation is often produced (**546**).

Charcot's Joint-disease.

558. In *Charcot's Joint-disease*, similar changes may occur in the wrist, leading to complete dislocation, as in the case of the shoulder (**418**) and elbow (**477**).

Anchylosis.

559. *Anchylosis* of the wrist-joint may be due to the same causes and of the same nature as in the case of the shoulder (**421**). It is very frequently the result of changes in the parts round about the joint, *e.g.* fibrous adhesions about the tendons or between the tendons and their sheaths, in connection with joint-disease, teno-synovitis (**507**), fractures about the lower end of the radius, *e.g.* Colles' fracture (**535**), &c.

CHAPTER XLIX

DISLOCATIONS OF FINGERS AND THUMB

Dislocations of Fingers and Thumb { Metacarpo-phalangeal. / Phalangeal.

Dislocations of Fingers and Thumb.

560. *Dislocations of the Fingers and Thumb* may occur at the metacarpo-phalangeal or at the phalangeal joints.

1. Metacarpo-phalangeal.

1. *Metacarpo-phalangeal.*—Dislocation may occur at any of the metacarpo-phalangeal joints, but is most commonly met with in the case of the thumb.

In this injury, generally the result of a fall or blow upon the end of the palmar surface of the finger or thumb, as the case may be, the base of the first phalanx is displaced backwards so as to lie upon the dorsal surface (much less frequently upon the palmar surface), of the head of the metacarpal bone.

Symptoms.—The thumb or finger, as the case may be, is shortened, and the base of the first phalanx forms a distinct prominence on the dorsal surface of its corresponding metacarpal bone, the head of which projects in front.

In the case of the *thumb*, considerable interest attaches to the dislocation backwards, owing to the great difficulty often experienced in effecting the reduction; this is probably due to the fact that the neck of the metacarpal bone is tightly constricted by the two heads of the flexor brevis pollicis ("as a button is fastened into a button-hole"), which being inserted

into the base of the first phalanx, are carried backwards along with it over the head of the bone; in cases, where the rent in the capsule of the joint is small, the difficulty is increased, the neck of the bone being in addition grasped by the fibrous tissue which forms it, and which also unites together the two heads of the muscle.

It has also been referred to interposition of the ligaments of the joint, or of the sesamoid bones, between the articulating surfaces.

2. Phalangeal.

561. 2. *Phalangeal.*—Dislocation of the fingers or the thumb at the phalangeal joints may take place in either a backward or a forward direction, the former being the most common.

The nature of the injury is always evident, the finger or thumb being shortened, and the base of the dislocated phalanx projecting on the dorsal or palmar surface of the proximal phalanx, as the case may be.

CHAPTER L

FRACTURES OF THE CARPAL AND METACARPAL BONES AND PHALANGES

Carpal Bones.

562. *Fractures of the Carpal Bones.*—Simple fractures of the carpal bones are of rare occurrence; they are usually the result of direct violence, *e. g.* a severe crush or blow. Owing to their numerous ligamentous connections, very little displacement is generally present, though crepitus is usually a prominent symptom. In the majority of cases, the fracture is compound, being associated with considerable laceration of the soft tissues.

Metacarpal Bones.

563. *Fractures of the Metacarpal Bones* are not uncommon as the result of direct violence, the usual seat of fracture being their middle or distal third; less frequently, the fracture may involve the articular ends of the bones and adjacent joint; separation of the epiphysis may also occur. When the shaft is involved, the displacement of the fragments is in some cases very slight, while in others it is considerable, the head of the bone dropping or sinking forwards towards the palm, and the fractured ends being displaced backwards so as to form an angular projection on the back of the hand.

Symptoms.—When no displacement is produced, the only symptoms present will be crepitus, abnormal mobility, pain and more or less swelling; when displacement is present, there will, in addition, be drop-

ping of the knuckle and an angular projection on the dorsum of the hand.

564. *Fractures of the Phalanges* are often seen. The fracture, which is very commonly compound, is usually situated about the middle of the shaft and can be readily recognised by the presence of crepitus, abnormal mobility, and more or less displacement of the fragments. Phalanges.

CHAPTER LI

AFFECTIONS OF METACARPAL BONES AND PHALANGES

Enlargement or Swelling of a Phalanx.

565. *Enlargement or swelling of a Phalanx* may be due to any of the following causes:

- Enlargement or Swelling of a Phalanx
  - Inflammatory
    - Periostitis (566).
    - Callus after fracture (564).
    - Caries or Necrosis (when dead bone is surrounded by a sheath of new osseous tissue) (567).
    - Deposit of Osteophytes (in Rheumatic Arthritis) (576).
  - New growth
    - Exostosis (570).
    - Fibroma (569).
    - Sarcoma (569).
    - Enchondroma (571).

Periostitis of a Phalanx.

566. *Periostitis of a phalanx* is often met with either as an acute or a chronic affection, the former usually occurring as the result of injury, *e.g.* in connection with Whitlow (**614**); the latter, either in connection with Struma or Syphilis.

Three chief varieties of Periostitis may therefore be described, viz. Traumatic, Syphilitic, and Strumous.

1. Traumatic.

1. *Traumatic.*—Acute Periostitis, the result of injury, *e.g.* in connection with a prick or poisoned wound, &c., is described under the Periosteal variety of Whitlow (**614**).

2. Syphilitic.

2. *Syphilitic Periostitis or Dactylitis.**—Chronic inflammation of the periosteum of the phalanges is often met with in young children, the subjects of congenital

* The term dactylitis (δάκτυλον—a finger) signifies inflammation of a finger or toe.

syphilis; much less frequently it occurs as a late or tertiary symptom in the acquired form of the disease. The proximal phalanges are the ones usually attacked, much less frequently the middle and distal ones are involved: in some cases, all three phalanges are affected.

The affected phalanges of one finger only, or of several fingers of one or both hands, as the case may be, more or less rapidly enlarge, until they become two or three times their natural size; the swelling, which is usually painless, being generally most marked when only a single finger is involved, affects the whole circumference of the shaft, so that the phalanx acquires a characteristic, fusiform, or distinctly globular shape.

At first, the integument and surrounding soft tissues are unaffected, but after a time they usually participate in the inflammation and become more or less reddened and inflamed.

The swelling may remain in an indolent condition for a considerable period, and then under proper treatment may become absorbed and gradually disappear, the shaft of the bone either resuming its normal dimensions, or being left attenuated or somewhat shortened.

In other cases, the inflammatory deposit may soften and break down; under these circumstances more active evidence of inflammation will appear; suppuration will probably ensue, and if the abscess bursts externally, there will probably be a discharge of pus mingled with small particles of bone; if the destruction of bone is at all considerable, more or less deformity will result, for the affected phalanx will be left shortened, or it may almost completely disappear, fibrous tissue supplying its place and forming a kind of false joint between the two contiguous portions of bone.

Under these circumstances, the finger though left

considerably shortened and abnormally mobile, will still, in many cases, prove very useful, for the adjacent soft tissues by their contraction steady and strengthen the new or false joint.

In some cases, the metacarpal bones, especially those of the thumb and index-finger, are similarly involved at the same time or independently of the phalanges.

3. Strumous.

3. *Strumous Periostitis or Dactylitis.*—Chronic inflammation of the periosteum is also very frequently met with in strumous subjects, especially in children, occurring sometimes idiopathically, sometimes as the result of injury.

In many instances, it is associated with inflammation of the subjacent bone, the osseous tissue becoming simultaneously or afterwards implicated, and as a consequence caries or necrosis is often produced.

The affected phalanx becomes swollen and more or less reddened, presenting a characteristic flask-shaped or "blown-out" appearance, for in addition to the enlargement which is due to the thickening of the periosteum, the surrounding soft tissues become in most cases involved in the inflammatory process.

Suppuration often ensues and fistulous openings then form which lead down to soft and carious bone; in most cases, the whole shaft is destroyed, down to the epiphysis at one end and the articular cartilage at the other.

Caries and Necrosis.

567. *Caries* (**449**) and *necrosis* (**448**) of the phalanges are often met with as the result of one of the different varieties of periostitis (**566**) just described.

Necrosis of the terminal phalanx is a very common result of the periosteal variety of whitlow (**614**), which is so often seen in this situation.

In many instances, the dead bone is surrounded by

a sheath of new osseous tissue, so that the shaft of the affected phalanx is considerably thickened; sinuses are usually present, discharging pus mixed with small particles of osseous tissue, and leading down to the carious or necrosed bone; protruding from the orifice of the sinuses, little masses of prominent granulations are generally found.

568. The *tumours* or new growths usually met with in connection with the phalanges are as follows, viz. fibroma (**569**), sarcoma (**569A**), enchondroma (**571**), exostosis (**570**). Tumours of Phalanges.

569. *Fibromata.*—Slowly growing tumours, more or less distinctly lobulated, well defined, of firm consistence, and consisting simply of dense fibrous tissue, or of a mixture of fibrous tissue and spindle cells (fibro-sarcomata), are sometimes met with springing from the periosteum of the phalanges and causing, as they increase in size, absorption of the osseous tissue. 1. Fibromata.

569A. *Sarcomata* (**461**) of the central or periosteal variety are sometimes found in connection with the phalanges, but are of rare occurrence. 2. Sarcomata.

570. *Exostoses* or bony tumours (**460**) are in rare instances met with springing from either the proximal or distal extremity of a phalanx. 3. Exostoses.

When originating from the distal end of the ungual phalanx (a condition much less commonly met with in the finger than the toe), an exostosis often causes much trouble and inconvenience, for the nail becoming displaced and pushed upwards, inflammation of the matrix (**633**) is produced, and ulceration of the soft tissues over the tumour usually ensues.

571. *Enchondromata*, or tumours consisting of cartilage, are sometimes met with springing from the 4. Enchondromata.

phalanges and metacarpal bones, perhaps more frequently than any other form of growth.

In some cases, they spring from the interior of the bone, and expanding its outer table, as they grow, they are surrounded by a thin covering of bone; at times, the whole circumference of the shaft of the phalanx is expanded equally on all sides; more commonly the growth expands the bone in one direction only.

In other cases, they spring from the periosteum or outer table of the bone, but as they increase in size, they generally tend to spread inwards, infiltrating the cancellous tissue of the shaft to a greater or less extent.

Enchondromata usually present themselves as slowly growing tumours, of firm consistence, roundish or nodular in shape, with smooth and sharply-defined outline.

In some cases, they may attain considerable dimensions, growing to the size of an adult head, or even larger. They are usually unattended by any pain, only causing trouble and inconvenience from their bulk and interference with the movements of the hands; in many instances, they are multiple, several of the phalanges and metacarpal bones being simultaneously affected.

Pure enchondromata, when completely removed, do not as a rule show any tendency to return; if, however, the tumour is of a mixed character, *e. g.* a chondro-sarcoma, recurrence may take place either locally or in some distant part.

Enlargement or Swelling of a Metacarpal Bone.

572. *Enlargement or swelling of a metacarpal* bone may be due to any of the causes which produce the same condition in a phalanx, cf. (**565**).

Periostitis of a Metacarpal Bone.

573. *Chronic periostitis* of the metacarpal bones is very frequently met with in strumous subjects and resembles

the same affection when occurring in the phalanges (**566**).

Acute periostitis, the result of injury, and the syphilitic variety, are much less commonly met with, the strumous form, associated with inflammation of the subjacent bone and leading to caries or necrosis, being of most frequent occurrence.

Caries and Necrosis of Metacarpal Bones.

574. *Caries and necrosis* of the metacarpal bones resemble the same affections when occurring in the phalanges (**567**), being very frequently met with in strumous subjects as the result of chronic periostitis (**573**); in many instances, the whole shaft is destroyed, the articular ends and the neighbouring joints frequently escaping.

Tumours of Metacarpal Bones.

575. The metacarpal bones may become attacked with tumours similar to those described as attacking the phalanges (**568**); they are a favourite situation of enchondromata.

CHAPTER LII

DISEASES OF THE METACARPAL AND PHALANGEAL JOINTS

THE metacarpal and phalangeal joints may become the seat of various forms of disease, *e.g.* serous and suppurative synovitis, pulpy disease of the synovial membrane, articular ostitis, &c., and in each instance the general symptoms and course of the affection will be the same as in the case of the other larger joints of the upper extremity (cf. Chaps. 36—42). As the result of any of these forms of disease, anchylosis (**579**) may be produced, or disorganisation and destruction of the joint may result.

The same articulations also become the seat of peculiar changes in rheumatic arthritis and in gout.

Rheumatic Arthritis.

576. When *Chronic Rheumatic Arthritis* (**417**) attacks the joints of the hand, two specialised forms of the disease are met with, viz. nodular rheumatism and Heberden's nodosities;* they may occur together or independently of one another, and not unfrequently one or more of the large joints will be found to present evidences of the same condition; both forms of the disease are especially common in old age, being more frequently met with in females than in males.

1. Nodular Rheumatism.

In *Nodular Rheumatism*, or so-called "*Rheumatic Gout*," the small joints of the fingers become the seat

* Charcot, 'Clinical Lectures on Senile and Chronic Diseases,' New Sydenham Society, pp. 180, 196.

of changes exactly similar to those met with in the larger articulations, *e. g.* shoulder (**417**); there are, in the early stage, symptoms of subacute synovitis, followed after a time by similar changes in the articular ends of the bones, viz. absorption of their cartilages and articular surfaces, with deposits of osteophytes round about them, causing more or less enlargement and consequently deformity of the affected joints.

Associated with these changes, there is often spasmodic contraction of the muscles, leading to peculiar and often permanent malposition of the fingers.

Nodular rheumatism is generally symmetrical, affecting both hands; the joints first attacked are usually the metacarpo-phalangeal of the index and middle fingers; thence it spreads to the other articulations of the fingers and thumb, and after a time the other joints of the upper extremity, wrist, elbow, and shoulder, may successively become involved. Owing to the muscular contractions, which usually accompany the articular changes, certain well-marked deformities are often produced in the hands; in the form most commonly met with, there is flexion of the first and third, with extension of the second phalanges; at the same time, the metacarpal and wrist-joints are often flexed, and in many instances there is an inclination of all the fingers towards the ulnar border of the forearm and a deviation in the opposite direction of the second phalanges on the first.

Diagnosis.—Somewhat similar contractions are seen in other diseases, *e. g.* Paralysis agitans (**652**), Progressive muscular atrophy (**653**), &c., but in these cases the characteristic joint symptoms are not present. In Chronic gout (**577**) somewhat similar muscular contractions and deformities are sometimes met with, but

in these cases the presence of tophi or chalk-stones in the soft tissues round about the joint will usually assist in distinguishing between the two affections.

2. Heberden's Nodosities.

Heberden's Nodosities, or "*Articulorum Nodi*," is the term applied, after the name of the physician who described it, to a special form of rheumatic arthritis, which attacks mainly the second joints of the fingers and which produces a singular and characteristic deformity.

It is characterised by the presence of small, hard nodules about the size of a pea, situated close to the joints between the second and third phalanges.

There are generally two of these little nodosities situated at the level of the joint, which appears somewhat broader than usual, and is at the same time more or less stiffened; they appear to be due to simple enlargement (from deposits of osteophytes upon and around them) of the little osseous nodules which are normally found upon the dorsal aspect of the heads of the 2nd phalanges.

In most cases, the extremity of the finger is a little bent either to the right or the left.

The other phalangeal joints are often similarly affected though to a much less degree, and contrary to what is found in Nodular Rheumatism, the metacarpo-phalangeal articulations not unfrequently altogether escape.

In extreme cases, the little nodosities in this affection, and the osteophytic deposits in Nodular Rheumatism, may cause ulceration of and pierce the skin, so that a somewhat similar condition is produced to that sometimes found in chronic gout (**577**), but in Rheumatic Arthritis the denuded portions always consist of bone and not of a chalky deposit as in that affection.

Gout.

577. The small joints of the hands and feet are the

situations in which *Gout* usually first manifests itself; it may appear under two forms, viz. either as an acute or a chronic affection.

In *Acute Gout* the symptoms are those characteristic of acute synovitis, *e.g.* there is pain of a severe burning character, with great tenderness on the slightest pressure upon the joint; heat and redness of the soft tissues round about the joint, with considerable swelling due to effusion into its interior, are usually prominent symptoms; the skin over it presents a characteristic, tense, shining appearance, and considerable oedema, pitting on pressure, is usually found. Acute gout.

As a general rule, the affection shows itself somewhat suddenly and almost always at night; towards morning the pain and other symptoms subside to a greater or less extent, but only to grow worse again towards evening.

The attacks, which recur at more or less regular intervals, usually last five or six days, and then subside, the decline of the inflammation being followed by desquamation of the cuticle.

In most cases, more or less constitutional disturbance attends the local affection.

After a time, the disease tends to assume a chronic form, and permanent changes are produced in the affected joint.

Chronic Gout.—Gout may be chronic from the beginning, but more commonly the chronic form of the disease is met with as a consequence of the acute affection. Chronic gout.

The term, "chronic gout," is applied to those cases where the joints become permanently altered in structure and shape, and where consequently evidences of the affection are after a time constantly present.

Gout depends upon the presence of excess of Uric acid

in the form of Urate of Soda in the blood, and this becomes deposited from the blood in various parts of the body.

When attacking the joints, the deposit first occurs in the articular cartilages, and after a time the synovial membrane, ligaments, peri-articular structures, periosteum, and even the bones themselves become similarly affected, so that the articulations become stiffened or completely anchylosed, and at the same time swollen, nodulated, and consequently much deformed.

The term "tophi," or chalk stones, is applied to the deposits of Urate of Soda which form around the joints, more especially those of the fingers, and also in other parts of the body, *e.g.* in the external ear (Pt. I. **337**).

The chalky masses are at first soft and of doughy consistence, but after a time they become firm and hard, presenting themselves as roundish, ovoid, or irregular, nodulated swellings, distributed without any symmetry, and occupying especially the extensor surface of the joints.

The skin covering them is glossy, sometimes of a dull white colour, and in many intances the subjacent nodules are distinctly visible through it.

At times, inflammation is set up in the overlying tissues, the skin ulcerates and gives way, exposing the deposit of Urate of Soda, and there is a discharge of pus mixed with chalky matter; in many cases, ulcers are formed which are of an extremely intractable nature.

Last Joint Arthritis.

573. *Last Joint Arthritis** is the term applied to a peculiar affection of the phalangeal joints, occurring usually in young persons who inherit a tendency to true gout.

The terminal joints of the fingers and thumb are

* Hutchinson, 'Clinical Lectures,' plate 52.

those usually affected, but the second joints may also become implicated.

Anchylosis of the articulations is not produced, but they become considerably stiffened, and in some cases crepitation is present on movement; there is no tendency to any deposit of Urate of Soda, but the fingers are much congested and swollen, especially on exposure to cold.

This affection, which is persistent and not paroxysmal, is attended by but little pain, and this is not influenced by season or weather; after continuing for some years, it usually gradually disappears, undergoing a spontaneous subsidence.

579. *Anchylosis* (**421**) of the finger may be produced as the result of most of the preceding forms of disease. Anchylosis.

CHAPTER LIII

AFFECTIONS OF THE HAND

Cutaneous Affections.

580. The hand, more especially its dorsal surface, may become attacked with most of the eruptions described as affecting the arm and forearm (Chap. XLIII). The palm is a favourite situation of the squamous syphilide, or psoriasis (**588**), and also of the early skin eruptions met with in cases of congenital syphilis; it is also frequently affected with eczema (**581**). The thin skin between the folds of the fingers is a favourite site of scabies (**585**).

Eczema.

581. When attacking the dorsal surface of the hand and fingers, the general symptoms of *eczema* will be the same as those met with in the case of the arm (**488**); patches of eczema impetiginodes are not at all uncommon in these situations and also on the back of the wrist.

When attacking the integument of the palm, the skin, which is extremely irritable and itches considerably, presents a dry, thickened appearance and is traversed by numerous, deep, painful cracks and fissures, "*eczema fissum* or *rimosum*."

In other cases, its surface may be moist or covered with scabs, vesicles and pustules forming on the inflamed skin.

Eczema when limited to the hands, especially if involving both, is generally the result of some irritant application, and inasmuch as this affection is not at all

uncommon, in bakers, grocers, &c., from the irritant action of flour, sugar, &c., it is often known by the term of "*baker's itch*," "*grocer's itch*;" in the case of washerwomen, the constant irritation of soap, soda, and other materials employed in washing, may also excite this affection.

582. *Cheiro-pompholyx* or *Dysidrosis* is the term applied to an eruption characterised by the development of vesicles or bullæ on the tips and sides of the fingers, and palms of the hands. Cheiro-pompholyx.

It commences with heat and itching of the skin, rapidly followed by the appearance of small, boiled sago grain-like bodies embedded in the skin; these develop into vesicles, which in some cases dry up and are followed by slight desquamation; in other cases, they enlarge and running together form bullæ of considerable dimensions, which usually shrivel up in the course of a few days; less frequently they burst and discharge their contents, which consists of serum, usually clearish and always alkaline in reaction.

This affection, which is usually symmetrical affecting both hands, generally occurs in persons of a nervous temperament, especially those who are worried or overworked.

583. A peculiar form of Herpes (**489**), *Herpes Iris*, is sometimes met with on the back of the hand; it is characterised by the presence of rings of vesicles arranged round a central one, each being surrounded by concentric circles of various shades of red. Herpes.

584. *Ecthyma* (**491**) is not at all uncommon on the backs of the hands, especially in strumous or cachectic subjects. Ecthyma.

585. The thin skin of the interdigital webs is one of the favourite situations of *Scabies* (**487**). Scabies.

Tinea Circinata

586. The back of the hand is not unfrequently affected with patches of *Tinea Circinata* or *Ringworm* (**493**).

Ichthyosis.

587. *Ichthyosis* is the term applied to a dry, roughened condition of the skin, met with on the palm, sole, and other parts of the body, due to thickening of the epidermis and hypertrophy of the papillæ, and forming in well-marked cases an adherent, dark-coloured, irregular, hard incrustation, which is often mapped out by furrows into polygonal tracts.

The disease, which in some cases is hereditary, is often congenital and appears soon after birth; the name is derived from the supposed resemblance to the skin of a fish.

Xeroderma is the term applied to the milder form of the disease, where the skin is simply dry, roughened, and slightly scaly.

Psoriasis.

588. Simple *Psoriasis* may attack the backs of the hands, presenting characters similar to those described (**485**).

Palmar Psoriasis, or Psoriasis of the palm, is invariably of syphilitic origin, occurring in most cases either as a late secondary or tertiary manifestation.

The patches, which are usually symmetrical affecting both hands, are as a rule ill-defined, varying in size from a split-pea to a sixpence, or even larger; in some cases, they coalesce, forming patches of a curved, crescentic, or irregular shape; they are usually covered with a thin layer of scales, more abundant at the margin than in the centre of the patch, and if these are removed, the skin beneath is usually of a dull red or coppery colour.

In some cases the scales are almost entirely absent,

or mingled with the scaly patches, there may be deep cracks and fissures.

A favourite situation of this affection is the space or hollow between the thumb and forefinger.

589. The back of the hand is not unfrequently the seat of *Lupus Exedens or Non-Exedens* (**501**). Lupus.

Lupus Erythematosus (Pt. 1. **42**) may also occur in the same situation, the back of the hand being the spot most commonly attacked after the face, its favourite situation.

As a rule, both hands are affected, the disease here, as in the face, preserving its tendency to symmetry. It usually presents itself as a reddish patch, covered with scales or thin crusts, seldom ulcerating, and terminating in recovery, or leaving superficial whitish scars on a level with the surrounding skin.

590. *Glossy Skin* is the term applied to a peculiar glazed or glossy condition of the integument often observed on the fingers, hand, or forearm, after injury of one of the nerves supplying these parts. Glossy Skin.

It may follow complete or partial division of a nerve, or simple compression from implication in a cicatrix, callus after fracture, &c.

It is regarded as "a sign of peculiarly impaired nutrition and circulation, due to injury to a nerve."

"In well-marked cases, the fingers which are affected (for this appearance may be confined to one or two of them) are usually tapering, smooth, hairless, almost devoid of wrinkles, glossy, pink or ruddy, or blotched as with permanent chillblains. They are commonly also very painful, especially on motion, and pain often ex-tends from them up the arm." (Paget.)

A similar condition is often found on the palm of the

hand, less frequently on the dorsum, and it may extend for a short distance up the forearm.

In many cases, the nails of the affected fingers are dry and brittle (**631**).

In other instances, after similar injuries, vesicular and bullous eruptions develop with great rapidity on the skin of the part supplied by the affected nerve.

Hyperidrosis. Anidrosis. Bromidrosis. Chromidrosis.

591. Alteration in the amount or nature of the secretion of the skin is sometimes met with; when in excess, it is termed *Hyperidrosis;* when diminished or altogether absent, it is termed *Anidrosis.*

As local affections, these conditions are sometimes found after injury to one of the nerves of the forearm, affecting the parts supplied by the cutaneous branches of the affected nerve.

Bromidrosis is the term applied when the perspiration has a disagreeable odour; this condition may be general or limited to certain regions, *e.g.* the axilla, or feet.

Chromidrosis is a rare affection in which the perspiration is coloured.

Erythema.

592. *Erythema* is the term applied to a non-infective superficial inflammation of the skin, which is usually associated with some gastric disturbance or appears in connection with some cause of local irritation, *e. g.* a wound or breach of surface, &c. It bears some resemblance to Cutaneous Erysipelas (**593**), but differs from it in the fact that it is simply a local affection, being non-infective and not generally accompanied by any constitutional disturbance.

It is characterised by rosy redness of the skin, appearing in irregular patches of varying extent; the redness, which is accompanied by very trifling swelling, or by none at all, disappears readily on pressure, but at once returns when pressure is removed; the temperature of

the affected portion of skin is sometimes slightly raised, and a tingling or itching sensation is often present.

Erythema usually runs a rapid course, soon subsiding if the cause of irritation is removed.

It may be distinguished from Cutaneous Erysipelas (593) by attention to the following points: *e. g.* the absence of any constitutional disturbance and elevation of temperature; the more superficial nature of the inflammation, its more limited nature, and the fact that it does not show the same tendency to rapidly spread; the absence of any tendency to vesication, and of much or any swelling of the cutaneous tissues; the fact that the outline of the redness is not so distinctly limited, gradually losing itself and fading away in the surrounding healthy skin.

Erythema may attack any part of the hand or arm; cf. also, "Erythema nodosum" (497).

593. *Erysipelas*, the term applied to an acute contagious disease characterised by a spreading inflammation of the skin, or skin and subcutaneous tissue, and attended by more or less constitutional disturbance, may attack the hand or arm in any of its different varieties; it usually arises in connection with some wound or breach of surface, and is generally believed to be due to the entrance of a specific poison into the system. Erysipelas.

1. *Cutaneous or Simple Erysipelas* is a spreading inflammation of the skin, involving only to a very slight extent the superficial portion of the subcutaneous tissue; it is characterised by heat and uniform redness of the skin, usually of a vivid rosy hue, which disappears on pressure, but returns as soon as pressure is removed; the redness, which in exceptional cases may assume a dusky colour, commencing at the wound or 1. Cutaneous.

breach of surface, tends to spread more or less rapidly upwards along the arm towards the shoulder, usually with a well-defined outline, not gradually fading away in the surrounding healthy skin, as in the case of simple inflammation, *e. g.* Erythema (592).

More or less pain of a tingling or smarting character is present, and in most cases the glands at the elbow or in the axilla will be enlarged and tender on pressure; very frequently evidence of Lymphangitis (502) in the vessels above the affected part can be detected, and tenderness will sometimes be present along their course.

In severe cases, the inflamed part becomes swollen and œdematous, and bullæ form containing a clearish serum. If the wound, when one is present, is observed, it will be found that its secretion is arrested and there is a discharge of thin serum instead of healthy pus from its surface, which assumes a dry glazed appearance; if repair has taken place, it often breaks down again, the wound re-opening.

Cutaneous Erysipelas usually subsides in the course of a few days without producing any serious consequences; the redness gradually disappears, any vesicles, which may have formed, burst and discharge their contents, or dry up, forming slight incrustations, and at the same time desquamation of the cuticle takes place. More or less constitutional disturbance usually accompanies the local affection; the body temperature is raised, and one or more rigors with attacks of sickness often usher in the commencement of the attack.

For the diagnosis from Lymphangitis, cf. (502); from Erythema, cf. (592).

2. Cellulo-cutaneous or Phlegmonous.

2. *Cellulo-cutaneous or Phlegmonous Erysipelas* is a spreading inflammation of the skin and subcutaneous

tissue, differing from the preceding variety in the fact that the subjacent cellular tissue is involved as well as the skin which covers it.

It also differs from the cutaneous variety in the fact that the local and constitutional symptoms are of a much severer type, inasmuch as it very frequently goes on to suppuration and sloughing of the parts involved.

The general symptoms are the same, though of a more marked character; there is a similar redness of the skin, but it is of a more dusky hue, and its outline is not so distinctly circumscribed; swelling is always a more prominent symptom, the affected part soon becoming tense, brawny, and œdematous, pitting on pressure; pain is usually more severe, and large bullæ are often present containing a blood-tinged fluid.

In most cases, suppuration ensues, and under these circumstances the parts become boggy and fluctuating from the accumulation of pus which collects in the subcutaneous tissues; unless this is early evacuated by free incision, extensive sloughing of the skin and soft parts will result.

The constitutional symptoms are always of a severe character, the rigors are more marked, the temperature is higher, and there is always a tendency for blood-poisoning to supervene, especially if the patient is old and broken down in health.

3. Cellular or Diffuse Cellulitis.

3. *Cellular Erysipelas*, or *Diffuse Cellulitis*, is a spreading inflammation of the subcutaneous connective tissue, the skin being altogether free or only becoming secondarily involved; it is generally the result of a poisoned wound, *e.g.* one received in the dissecting or post-mortem room, &c., by which some septic material is introduced into the system.

Under these circumstances the inflammation does not

necessarily start from the wound, but may manifest itself at some distance from it.

The general symptoms are much the same as in the preceding variety, differing, however, in the fact that the skin does not participate in the primary inflammation; consequently there is at first an absence of redness, the affected part presenting a characteristic tense, white, shining, swollen appearance; in most cases, the skin after a time becomes involved, and is then reddened in patches, becoming of a dusky or livid hue and rapidly running into sloughs.

Sooner or later, suppuration, as a rule, ensues, and the pus often burrows widely, running along the planes of connective tissue, and causing extensive destruction and sloughing of the soft parts of the limb; at the same time inflammation and suppuration of the glands about the elbow or in the axilla are often present.

The constitutional symptoms are always of a severe type, and many cases rapidly prove fatal from the supervention of blood poisoning.

Œdema.

594. *Œdema* of Hand, cf. (**505**).

Myxœdema.

595. In cases of *Myxœdema* (Pt. I, **69**), the hands often present a peculiar "spade-like" appearance, being swollen and broadened; the fingers also have a clumsy appearance, and are much limited in range of flexion and extension.

Ulceration.

596. *Ulceration* of the back of the hand may be due to the same causes as in the case of the arm (**498**).

Gangrene.

597. *Gangrene* of the hand, which may appear under either the dry or moist form, is generally due to one of the following causes:

1. Direct injury to the hand or arm; *e. g.* severe wounds of various kinds, lacerations, contusions, fractures, &c., whereby the vitality of the tissues is at once

destroyed, or where the resulting inflammation is so intense that it is followed by death of the part.

In cases due to these causes, the gangrene is usually of the moist variety.

2. Arrest of the supply of arterial blood; *e. g.* obstruction of the main artery from operation (*e. g.* ligature), injury (*e. g.* rupture), or from disease (*e. g.* atheroma, embolism, thrombosis, cf. senile gangrene (600)).

Gangrene of the hand or upper extremity from obstruction of the main artery of the limb is not often met with (much less frequently than in the lower extremity), owing to the freedom of the collateral circulation.

In cases due to these causes, the gangrene is often of the dry variety.

3. Strangulation of the hand or arm, whereby the return of the venous blood from the part is prevented, while at the same time the supply of arterial blood is more or less completely cut off; *e. g.* tight bandaging in cases of fracture, &c.; under these circumstances, the gangrene is always of the moist variety.

598. In the *moist form of gangrene*, the hand becomes cold, swollen and œdematous; sensibility and the power of motion are lost, and the colour is changed to a dark purple or greenish-black more or less mottled with red; the cuticle separates from the cutis, and bullæ form containing a blood-tinged serum. Moist Gangrene.

As putrefaction takes place, gases are generated in the tissues, and emphysematous crackling is felt on making pressure upon the part; at the same time, a foul and offensive odour is evolved.

The termination of the gangrenous process varies; it may after involving one or more of the fingers, or a

part or the whole of the hand, become arrested, and a "line of demarcation" forming between the living and dead tissues, the latter may be separated and cast off by a process of ulceration and suppuration, a healthy granulating surface being left behind; under these circumstances, the gangrene is said to be "limited" or "circumscribed."

In other cases, *i. e.* in "spreading gangrene," the process rapidly extends upwards along the limb towards the trunk, similar changes occurring in the arm to those described as taking place in the hand; under these circumstances, a similar line of demarcation may form at some point in the forearm or arm, and the process becoming arrested as before, the dead parts may separate and be thrown off; or, the gangrene may continue to spread until it reaches the shoulder and trunk, and when this is the case, death as a rule speedily supervenes from blood-poisoning.

Spreading gangrene is therefore a very dangerous complication of wounds, for even if amputation is performed at a distance above the dead parts, there is always a tendency for recurrence of the condition to take place in the stump itself.

Dry Gangrene.

599. In the *dry form of gangrene*, one or more fingers, or part or the whole of the hand, gradually perish, drying and shrivelling up, and becoming converted into a black or brownish (less frequently dead-white), shrunken mass, often without any pain, or any symptoms of inflammation or constitutional disturbance; the part is colder than usual, and there is a loss of sensibility and power of motion, as in the moist form, but as a rule no offensive odour is given off from the dead tissues.

The dead part may remain in this "mummified" con-

dition for a considerable period, *e. g.* for some weeks or months, and then may be thrown off, a line of demarcation forming as before, or the process may very gradually spread along the forearm and arm, until it becomes arrested at some point in its course.

Senile Gangrene.

600. *Senile gangrene* is the term applied to a form of mortification which attacks the extremities of old people, in whom the circulation is weak and the arteries atheromatous and calcareous; as a consequence of these conditions, the supply of blood to the parts is interfered with, and their vitality being lowered, death of the tissues results.

Senile gangrene, which much more frequently attacks the toes than the fingers, is usually of the dry variety (**599**); in many cases it appears spontaneously and without any obvious cause; in other instances, it is excited by some inflammatory process occurring in the parts, often as the result of some trivial injury, and under these circumstances, the tissues being infiltrated with the products of inflammation, the gangrene tends to be rather of the moist variety.

Symmetrical Gangrene.

601. *Symmetrical gangrene of the extremities* is the term applied by M. Raynaud to a rare form of gangrene, which though it usually attacks the limbs, is not confined to these parts as it may also involve the face and trunk.

"It is characterised by the absence of any discoverable lesion in the viscera or in the arterial system, and by its symmetrical arrangement, homologous portions of the two halves of the body being attacked.

"The affected parts become quickly livid, apparently from arrest of the arterial blood-supply and venous stasis; this is quickly followed by transudation from

the vessels into the skin and connective tissue and is accompanied by sharp darting or stabbing pains.

"Cases are described where the process stops short of this stage, the affected limbs becoming temporarily pale and cold and then recovering after a few minutes or hours, to be again attacked however after a varying interval.

"Arguing from such cases as these, the phenomena of the disease have been attributed to spasm of the walls of the arterioles in the affected parts. Though the symmetrical distribution of the gangrene suggests a central, probably nervous, origin, yet there is absolutely no evidence on the point which can be considered at all conclusive.

"Some connection has been supposed between this symmetrical gangrene and scarlet fever and measles, since it has sometimes occurred after one or other of these diseases."*

Other points in connection with this affection, which, when it goes on to actual gangrene, may assume either the dry or the moist form, and involve only the tips of the fingers or toes or the whole extremities, are the severity of the symptoms, the impotence of any form of treatment, and in many cases the tender age of the patient; in some instances the patient has been considerably affected with intermittent hæmatinuria.

Abscess.

602. An abscess may appear either on the palmar or dorsal surface of the hand.

Palmar abscess, or suppuration beneath the palmar fascia, is often met with, in some cases as the result of direct injury, *e.g.* a punctured wound, in other cases as the result of extension of inflammation from the fingers, *e.g.* in connection with Whitlow (**614**), especially when

* 'Brit. Med. Journal,' 1882, vol. ii, pp. 1155, 1167.

of the tendinous variety; it may also appear in connection with disease of the metacarpal bones, but under these circumstances an abscess more commonly presents itself on the dorsum of the hand, the pus tending to make its way externally in the direction of least resistance.

When of an acute nature, the palm of the hand becomes hot, swollen, and extremely painful; tenderness is present on pressure, and the integuments are more or less reddened and œdematous; the movements of the hand are impaired, and the fingers are stiff and held in a semi-flexed position; fluctuation is often very indistinct, owing to the pus being firmly bound down by the palmar fascia, and the density and resistance of this structure prevents the abscess from readily pointing in the palm.

In many instances, the soft tissues on the back of the hand become involved from extension of inflammation, and owing to the fact that the skin here, especially between the fingers, is thinner than in the palm, the abscess frequently points and discharges its contents in this situation.

In other instances, the suppuration, instead of remaining confined to the palmar and dorsal surfaces of the hand, may involve the great synovial sheath of the flexor tendons (cf. Suppurative Tenosynovitis (**507**)), and extending beneath the anterior annular ligament to the lower part of the forearm, the pus may point just above the wrist-joint.

Under these circumstances, extensive destruction of all the parts may be produced, *e.g.* sloughing of the tendons, caries and necrosis of the bones of the hand and wrist, and complete disorganisation of the joints.

An abscess on the dorsum of the hand is often found

in connection with disease of the metacarpal bones, the pus, under these circumstances, tending to make its way externally in this direction, inasmuch as it meets with less resistance than in the palm: it may also occur as the result of inflammation of the soft tissues alone in this situation from any cause, or appear in connection with disease of the wrist-joint, or with suppuration in the palm, as described above.

Teno-synovitis.

603. *Teno-synovitis* (**507**), or inflammation of the sheaths of the tendons about the hand, is often met with; when the extensor tendons on its dorsal surface are involved, an elongated swelling following their course is produced, presenting symptoms similar to those described (**507**).

An uncommon form of Teno-synovitis, due to tubercular disease of the synovial sheaths, is described as occurring in the tendons of the hand, more frequently than in any other situation.*

Tumours of Tendons.

604. In addition to Ganglia (**607**), small tumours, generally of a fibrous or cartilaginous nature, are sometimes met with connected with the sheaths of the tendons, especially those about the hand; they usually present themselves as firm, moveable, well-defined localised swellings, appearing in the course of a tendon, giving rise to a varying degree of pain, and interfering more or less with the movement of the part.

Clavus or Corn.

605. *Clavus* or *Corn* is the term applied to the thickened and horny condition of the epidermis so often seen on the toes and feet, but which may also occur on any part of the body continually exposed to intermittent pressure or friction, *e.g.* on the palm of the hand, and the palmar surfaces of the fingers and thumb, from the mechanical irritation of tools, &c.

* 'Lancet,' 1882, vol. ii, p. 153.

606. *Contraction of the Palmar Fascia*, or "*Dupuytren's Contraction*," is an affection of the palmar fascia much more common in males than females, and usually occurring at or after middle age. Contraction of Palmar Fascia.

In some cases it is associated with a rheumatic or gouty diathesis, and under these circumstances is often hereditary; in others, it appears to be due to some cause of local irritation, *e.g.* the use of tools, &c., employed in various occupations.

In this affection, one or more of the fingers become very gradually contracted and drawn towards the palm, so that after a time a permanent deformity is produced.

The fingers first involved are usually the ring and little one; subsequently the middle and index may become affected, the thumb usually altogether escaping.

In many instances the contraction is symmetrical, both hands becoming simultaneously or successively attacked.

In advanced cases, the skin of the palm of the hand, which is adherent to the contracted bands of fascia, is wrinkled and thrown into folds.

At first sight it would appear as though the deformity were due to contraction of the subjacent tendons and their sheaths, but these structures are unaffected and usually perfectly healthy, as is proved by the fact that after division of the thick and rigid bands of contracted fascia, the fingers can generally be straightened.

Contraction of the palmar fascia must not be confounded with the cicatricial contraction of the soft tissues (**511**) which so often follows injuries of the palm, *e.g.* extensive lacerations, burns, &c.; in these cases there will be a history of injury, and on examination of the palm, dense scar-tissue, often raised in

rigid bands or folds, will usually be found to be present: in most instances the condition is unilateral, affecting only one hand.

Ganglion.

607. The palm of the hand is not unfrequently the seat of a *compound ganglion* (**533**); much more rarely a *simple ganglion* becomes developed in the same situation, presenting itself in some cases as a small tumour about the size of a pea, semi-solid or almost solid, lying beneath the palmar fascia, and connected with the sheath of the flexor tendons.

Simple ganglia is very often met with on the dorsum of the hand, in connection with the sheaths of the extensor tendons, cf. (**533**).

Painful Subcutaneous Tubercles.

608. *Painful Subcutaneous Tubercles* are sometimes found on the digital nerves, or connected with the sheaths of the flexor tendons of the palm of the hand, presenting symptoms similar to those described (**528**).

Lipoma of Palm.

609. *Lipomata*, or *Fatty Tumours*, of the palm are rare affections.*

The tumour, which springs not from the subcutaneous fatty tissue, but from the fat under the deep fascia or between the muscles, is soft, semi-fluctuating, of slow and painless growth, and possesses a rounded outline.

Owing to the fact that in some cases it extends upwards beneath the annular ligament, it may simulate a compound ganglion (**533**); it can, however, usually be distinguished by the absence of true fluctuation, especially on making alternate pressure on the swelling above and below the annular ligament; also by the absence of the characteristic crackling sensation due to the presence of melon-seed bodies found in most cases of ganglion; also by the fact that on exploratory punc-

* 'Lancet,' 1882, vol. ii, p. 154.

ture no fluid will be found, but a small pellet of fat can often be extruded, which will confirm the diagnosis.

From abscess, with which it may also be mistaken, it can be distinguished by the slow and painless nature of the growth, and also by the absence of true fluctuation and any evidence of inflammatory action.

Aneurism of Palmar Arch.

610. *Aneurism of the Palmar Arch* is of rare occurrence, but may follow a punctured wound of the vessels in this situation in the manner described (**516**); the tumour will present the general symptoms of aneurism; there will usually be a history of injury, and in many cases the scar of the wound can be distinguished in the neighbourhood of the swelling.

Warts.

611. *Warts, Verrucæ*, or *Papillomata, i.e.* small growths or excrescences, usually multiple and frequently occurring in large numbers, seldom larger than a pea or bean, and due to hypertrophy of the papilla of the skin and overlying epidermis, are often met with on the hand, especially about the dorsum and fingers.

They are usually found in young people, often appearing in children or about puberty, without any apparent cause; in some cases they are persistent, remaining in a stationary condition for a considerable period; in other cases they may, after a variable length of time, suddenly spontaneously disappear.

In some instances, warts appear to be due to some local irritation, *e.g.* the so-called "dissection warts" which form on the hands of those engaged in the post-mortem or dissecting room.

In exceptional cases, the little growths originate beneath the nails, cf. Subungual Warts (**636**).

Tumours of Palm.

612. *Tumours of Palm.*—The following are the chief

forms of tumours or swellings met with on the palm of the hand:

1. *Connected with the soft tissues*:—Ganglion (**607**); Palmar Abscess (**602**); Teno-synovitis of Flexor Tendons (**603**); Aneurism of Palmar Arch (**610**); Painful Subcutaneous Tubercle (**608**); Lipoma (**609**); Tumours of Tendons (**604**).

2. *Connected with the Metacarpal Bones*:—cf. (**572**).

Tumours of Dorsum of Hand.

613. *Tumours of Dorsum.*—The following are the chief forms of tumours or swellings met with on the dorsum of the hand:

1. *Connected with the soft tissues*:—Ganglion (**607**); Abscess (**602**); Teno-synovitis of Extensor Tendons (**603**); Tumours of Tendons (**604**); Warts (**611**); Subcutaneous Rheumatic Nodules (**532**); Epithelioma (Pt. I, p. 34); Sarcoma (**520**), &c.

2. *Connected with the Metacarpal Bones*:—cf. (**572**).

CHAPTER LIV

AFFECTIONS OF THE FINGERS

THE fingers may become affected with most of the cutaneous affections described as attacking the hand, *e. g.* eczema (**581**), cheiro-pompholyx (**582**), &c.; they are also liable to become attacked with gangrene (**597**), erysipelas (**593**), &c., and in cases of œdema (**594**), myxœdema (**595**), glossy skin (**590**), &c., present appearances similar to those described.

Whitlow or Paronychia.

614. *Whitlow** or *Paronychia** is the term applied to an acute, inflammatory affection, often terminating in suppuration, of one or more of the structures entering into the formation of the finger; it may manifest itself under four different forms, viz.:

1. Cutaneous whitlow, where the skin only is involved.

2. Cellulo-cutaneous whitlow, where in addition to the skin, the subcutaneous tissue is also involved.

3. Tendinous whitlow, where the sheaths of the tendons are involved.

4. Periosteal whitlow, where the periosteum of the phalanges is involved.

* The derivation of the term whitlow is somewhat obscure; it is probably derived from *white* and (Saxon) *low*, a flame, signifying literally, "a white inflammation." Paronychia (*παρα*, near or beyond; *ὀνυξ*, a nail) signifies inflammation of the parts around the nail, *i. e.* of the soft tissues of the finger, as opposed to onychia (633), or inflammation of the matrix of the nail itself.

1. Cutaneous.

1. *Cutaneous Whitlow* is most frequently met with on the tip of the finger on its palmar surface, or about the root or margin of the nail.

In this variety the inflammation is confined to the integument of the affected portion of the finger, and in many cases a small collection of pus, often not larger than a pea, forms between the epidermis and cutis; when the inflammation extends deeper, involving the subcutaneous tissue, the cellulo-cutaneous variety of whitlow is produced.

Slight swelling will generally be present, with some degree of redness of the surrounding tissue, though the skin over the collection of pus itself will usually be paler than normal; more or less pain will be complained of, especially upon pressure over the spot, but it is never of so severe a nature as in the other forms of whitlow, when the deeper parts are involved. Cutaneous whitlow is usually produced as the result of a prick or scratch with exposure to some irritant matter; in many cases, mere contact with irritant matter without the presence of any wound appears to excite this affection.

2. Cellulo-cutaneous.

2. *Cellulo-cutaneous Whitlow* is usually found affecting the terminal digit, the inflammation commencing either primarily in the subcutaneous tissue and afterwards involving the skin, or in the skin (cutaneous whitlow) and spreading to the connective tissue beneath.

The symptoms are always of a much more severe character than in the preceding variety; it commences with a hot and painful swelling of the affected portion of the finger; more or less redness will be present, usually more marked on the dorsal and lateral aspects of the finger than on its palmar surface, which owing to its

thick covering of epidermis often presents a whitish or yellowish appearance.

In many cases, suppuration occurs, the formation of pus being attended by extreme pain with a feeling of throbbing and great tension in the affected part; this is especially the case when the dense pulpy tissue of the end of the finger is involved, the pus being then pent up and unable to make its way externally; under these circumstances, it is often extremely difficult to say whether fluctuation is present or not, extreme tenderness being complained of on the slightest pressure. The local inflammation is often attended by considerable constitutional disturbance, as the severe pain frequently prevents all sleep. If free vent is afforded by incision to the pus as soon as it has formed, complete recovery will usually rapidly take place; in other cases, the inflammation extending more deeply may involve the periosteum or sheath of the tendons, the periosteal or tendinous variety of whitlow being produced; of these two complications (for reasons described further on), the periosteal is most likely to result when cellulo-cutaneous whitlow attacks the tissues of the terminal phalanx, the tendinous, on the other hand, when the tissues of the middle or proximal phalanges are involved.

Cellulo-cutaneous whitlow is usually produced in the same way as the preceding variety, viz. contact of some slight wound or even unbroken surface with irritating or poisonous material.

Both forms are often met with on the fingers of residents in hospitals, especially when the vital powers are lowered from any cause, and under these circumstances, several fingers may be attacked at the same time or in succession.

3. *Tendinous Whitlow* may be due to extension of in- 3. Tendinous.

flammation in the cellulo-cutaneous variety; or, it may be the result of direct injury, *e. g.* a punctured wound, such as a prick with some sharp instrument, piercing the sheath of the tendon.

For anatomical reasons (viz. because the tendons of the Flexor Profundus Digitorum are inserted into the bases of the terminal phalanges and consequently their sheaths do not extend beyond this point), this variety is only met with in the middle and proximal phalanges, both of which are usually involved, for the inflammation generally spreads more or less rapidly from one to the other along the sheath of the tendons.

The symptoms are usually of a very severe type, more so even than in the preceding variety.

Extreme pain of a throbbing kind is complained of with great tenderness on pressure; more or less swelling is present, but this is never a very prominent symptom and is usually slight in proportion to the severity of the pain. There is not much redness of the integument unless the cutaneous tissues are also involved, on the contrary, the skin, especially on the palmar surface of the finger, often appears paler than usual.

In favorable cases, the inflammation subsides without the formation of pus, and under these circumstances recovery takes place, but often with some temporary stiffness of the finger, owing to the formation of adhesions between the tendons and their sheaths.

In other instances, suppuration ensues within the sheath of the tendon, a "thecal abscess" forms, and unless an outlet is speedily supplied for the pus, extensive destruction and sloughing of the tendons will probably take place; under these circumstances, portions of the tendons often slough and come away, so that the finger will be left permanently stiffened and

useless; or it may become so completely disorganised that amputation will be required.

In other cases, the pus burrowing backwards along the sheath of the tendons may make its way into the palm, and give rise to the presence of a Palmar Abscess (602); or, it may burrow further onwards beneath the annular ligament into the forearm, involving the great synovial sheath which invests the flexor tendons of the fingers in front of the wrist (cf. footnote, p. 376).

The latter complication is more likely to occur in cases of tendinous whitlow attacking the thumb and little finger, owing to the fact that the great synovial sheath communicates with the sheaths of the flexor tendons of the thumb and little finger, while it does not do so with those of the second, third, and fourth fingers.

In other cases, the inflammation spreads from the sheath of the tendon to the periosteum, giving rise to the periosteal form of whitlow. As in the preceding variety the local inflammation is usually accompanied by considerable constitutional disturbance.

4. *Periosteal Whitlow* most commonly attacks the terminal phalanges, though it is also met with in the others. 4. Periosteal.

It is produced in the same way as the other forms of whitlow, and may commence either as a primary periostitis or be due to extension of inflammation from the superficial structures.

When attacking the terminal phalanx, its favourite situation, it is often secondary to cellulo-cutaneous whitlow, the inflammation spreading directly from the pulpy tissue of the end of the finger to the subjacent periosteum with which it is in intimate connection, nothing intervening, as the sheaths of the flexor tendons do not extend beyond the bases of the terminal pha-

langes, into which the deep flexor tendons are inserted. The symptoms are much the same as in the preceding variety, *i. e.* there is a deep-seated, extremely painful, throbbing swelling, exquisitely tender, and accompanied by more or less external evidences of inflammatory action, according as the superficial structures are involved or not.

In many instances, suppuration ensues, pus forming between the periosteum and the bone ("periosteal abscess"); under these circumstances, partial or complete destruction of the bone will in many cases rapidly take place ("acute necrosis"), and very frequently the insertion of the flexor tendon will also slough and come away.

When attacking the other phalanges, proximal or middle, periosteal whitlow is often found associated with the tendinous variety, for the sheath of the tendons and the periosteum being in close connection and, as it were, continuous with one another, inflammation is very likely to spread from one structure to the other.

In some cases, the phalangeal joints become involved, but not at all uncommonly they altogether escape.

Frost-bite.

615. *Frost-bite* is the term applied to a condition produced as the result of exposure to severe cold, and usually met with in the extremities, *e.g.* the fingers or toes.

In slight cases, the fingers become stiffened and numb or "dead," *i. e.* devoid of sensation; the skin, which is pale or of a bluish tint, is shrunken or thrown into wrinkles; in ordinary cases, if the part is removed from exposure to cold at this stage and the circulation gradually restored, the symptoms rapidly disappear; the skin becomes reddened, the finger slightly swells,

and a peculiar sensation of tingling and itching is experienced; complete recovery usually ensues, or in some instances chilblains (**616**) appear.

In severe cases, where the cold is more intense and prolonged, the vitality of the part is entirely destroyed and gangrene (**597**) ensues; this may be of the dry form, the parts shrivelling up and at once perishing, assuming an ashy-grey or black appearance.

In other instances, the gangrene is of the moist variety; when this is the case, it is always preceded by symptoms of inflammation, the frozen part becoming hot, swollen, and extremely painful, vesicles form on the inflamed surface and extensive sloughing of the tissues often ensues.

In either instance, death of a greater or less portion of the finger or hand will ensue, the gangrene extending and sometimes involving the forearm, until a "line of demarcation" forms between the dead and living tissues.

616. *Chilblain* (or "*Pernio*") is the term applied to a localised inflammation of the skin, usually met with on the extremities, either fingers or toes, as the result of exposure to cold or sudden changes of temperature; it may be regarded as a very mild form of frostbite (**615**). Chilblain.

A chilblain usually manifests itself as a local congestion or bluish-red swelling of the skin, which is accompanied by considerable tenderness and severe burning or itching, especially when the extremities are warm, *e.g.* in bed, sitting before a fire, &c.

In severe cases, small blisters form on the inflamed portions of skin, and when these burst, ulcers are often produced, which in some instances may extend somewhat deeply and cause considerable destruction of the part.

Digital Chancre.

617. *Chancres*, or syphilitic sores, are sometimes met with on the fingers, usually in surgeons, obstetricians, or midwives, contracted in making digital examinations of the vagina in syphilitic women.

"The commonest seat of chancre of the finger is at the side or base of the nail, or at its free margin. It begins as a papule, pustule, slight excoriation, or fissure; on examination, a deep-red, hard, elevated mass of moderate size is perceived, which when ulcerated, yields a scanty serous secretion. The entire phalanx is sometimes indurated, giving the finger a bulbous shape. The epitrochlear and axillary glands are usually enlarged, and moderate lymphangitis is sometimes present."*

Clubbed Fingers.

618. *Clubbing of the Finger-ends, i. e.* increase in the breadth and thickness of the extremities of the fingers, so that they appear enlarged or "clubbed," with arching of the nails, which are uncated or bent inwards over the tips, is often seen in phthisis, and when present may be looked upon as an indication of a tendency to this disease.

The same condition is also often met with in cases where the general circulation is obstructed, *e.g.* in morbus cordis, empyema, bronchiectasis, &c., in fact, in all cases where there is imperfect oxygenation of the blood from any cause; and under these circumstances, the finger-ends often present a characteristic congested, blue or purplish appearance. In rare instances, this condition may be due to some local cause of pressure interfering with the return of blood from the upper extremity, *e. g.* a tumour in the neck or axilla.

Dislocation of Tendons.

619. *Dislocation of the Extensor Tendon* of the middle finger is sometimes met with, the tendon slipping or

* Van Harlingen, 'Internat. Encycl. of Surgery,' vol. ii, p. 466.

becoming displaced to one side of the heads of the metacarpal bone or first phalanx.

Tumours of Fingers.

620. The various *tumours or swellings* met with in connection with the fingers may be arranged as follows:

1. *Connected with the Soft Tissues.*—Whitlow (**614**) (including abscess) (**621**); warts (**611**); corns (**605**); chalk-stones (**577**); subcutaneous rheumatic nodules (**532**); neuromata (**622**); bursal tumours (**623**); cystic tumours (**624**); lipomata (**625**); fibrous, cartilaginous, or osseous tumours (**626**); aneurism (**627**); tumours of tendons (**604**).

2. *Connected with the Phalanges*, cf. (**565**).

3. *Connected with the Joints.*—In the various affections of the phalangeal joints, *e.g.* rheumatic arthritis (**576**); gout (**577**); pulpy disease (**471**), &c., considerable enlargement and swelling of the affected articulation is usually produced.

Abscess.

621. *Abscesses* are of frequent occurrence about the fingers, occurring either in connection with the soft tissues, sheaths of the tendons, "thecal abscess," or periosteum, "periosteal abscess;" they are generally included under the term, whitlow, the different varieties of which have already been described (**614**).

Neuromata.

622. *Neuromata* are occasionally found in the fingers, situated in the course of the digital nerves, or at the extremity of the finger, or beneath the nail itself; in their general characteristics they resemble those described (**528**).

Bursitis and Bursal Tumours.

623. The subcutaneous *bursæ* situated over the dorsal aspect of the phalangeal and metacarpal joints of the fingers may become the seat of acute or chronic inflammation, and occasionally solidification of their contents may ensue, cf. (**531**); more rarely, the small bursæ occasionally met with over the flexor tendons, as they

pass over the joints, become similarly affected, presenting themselves in some cases as solid or semi-solid tumours, quite moveable, and lying beneath the skin anterior to the sheaths of the flexor tendons.

"Mr Holden has directed attention to small hernia-like protrusions of the synovial membranes through the sheaths of the flexor tendons of the fingers; these vary in size from a pin's head to a pea, are firm to the touch, and are filled with a reddish substance, having the consistence of jelly. I have myself frequently observed these tumours in the dead body. Mr Holden has also noticed them in the living hand and he found that they interfered with the free movement of the fingers."*

Cystic Tumours.

624. *Cystic Tumours*, of the nature of sebaceous cysts, are occasionally found under the skin of the digits. "I have on two different occasions cut out small encysted tumours from the palmar aspect of the fingers; they lay immediately underneath the integument, and their contents were similar to those which are found in the common wen."†

Lipomata.

625. *Fatty Tumours* "are rare in the digits, and when they do occur are usually of a diffuse kind and continuous with the subcutaneous tissue of the part."‡

Fibrous, Cartilaginous and Osseous Tumours.

626. *Fibrous, Cartilaginous* and *Osseous Tumours* "are occasionally found in the soft tissues of the digits, unconnected with the tendons, periosteum, or bone; but much more frequently they occur in connection with the latter tissue."§ Cf. (**568**).

Aneurism of Digital Arteries.

627. *Aneurisms of the Digital Arteries* are of extremely

* Annandale, 'Diseases of the Fingers and Toes,' p. 113.

† *Ibid.*, p. 158; and 'Brit. Med. Journ.,' 1883, vol. ii, p. 773.

‡ *Ibid.*, p. 158.

§ *Ibid.*, p. 159.

rare occurrence. Mr Annandale describes a case (*), where after a prick, a pulsating tumour, the size of a marble, which presented all the symptoms of aneurism, formed on the side of one of the fingers, and similar cases are also recorded by other surgeons.

Contracted or Bent Finger.

628. A *contracted or bent finger* may be due to various causes.

1. Congenital, *e. g.* club-hand (**682**).
2. Anchylosis of the joints (metacarpal or phalangeal), the result of disease (Chap. 52).
3. Contraction of palmar fascia (**606**).
4. Paralysis of extensor, or spasm of flexor muscles of fingers; *e. g.* claw-hand after paralysis of ulnar nerve (**646**).
5. Division of extensor tendons of fingers.
6. Tenosynovitis (**603**) causing adhesions between the tendons and their sheaths, or between the sheaths and the surrounding soft tissue, in the fingers, hand, or forearm.
7. Cicatricial contractions after ulceration, abscess, or injuries attended by considerable loss of tissue, *e. g.* burns, laceration, &c. involving only the integument, or in addition the muscles and tendons of the flexor surface of the fingers, hand, or forearm.

Extended Finger.

629. An *extended and often stiffened finger* may be due to various causes.

1. Congenital, *e. g.* club-hand (**682**).
2. Anchylosis of the joints (as above) (**628**).
3. Paralysis of the flexor, or spasm of the extensor muscles of fingers; under these circumstances the fingers may become hyper-extended; *e. g.* in paralysis of median nerve (**645**).
4. Division of the flexor tendons.

* 'Annandale,' op. cit., p. 163.

5. Tenosynovitis (as above) (628).

6. Cicatricial contractions (as above) involving the extensor surface.

Neuralgia.

630. *Neuralgic pains*, with or without tenderness on pressure, are not unfrequently complained of in the fingers, for which in many cases no cause can be found.

In some instances, the symptoms are referred to one of the joints, which may present on examination a perfectly normal condition, cf. neuralgia of elbow-joint (478).

In other cases, the symptoms are due to the presence of a painful subcutaneous tubercle (528), and under these circumstances, one particular spot will often be found extremely sensitive and painful when touched.

In other cases, again, the symptoms follow some injury, *e. g.* an incised or lacerated wound, and are due to the implication of a nerve in the cicatrix ("painful cicatrix") or to the formation of a traumatic neuroma (529), or to the presence of some foreign body embedded in the soft tissues and pressing upon a nerve: under these circumstances, the pain is frequently not confined to the finger but shoots up along the hand and arm.

In all cases, when no cause can be found in the hand or finger to account for the pain, the limb above should be carefully examined, to see whether any swelling or source of irritation is present in the course of the nerve-trunks, which supply the part.

CHAPTER LV

AFFECTIONS OF THE NAILS

631. In *Psoriasis*, the nails become more or less thickened, heaped-up, opaque and irregular, splitting up and presenting on their surface transverse striæ; at the same time, they are very friable and often fissured at their free margin. Psoriasis.

In some cases, they become more or less separated from the soft parts, so that they are readily detached and shed.

The causes which tend to produce these conditions are threefold, viz.

1. *Syphilitic*, when it occurs as one of the manifestations of constitutional syphilis.

2. *Parasitic*, when the nails become affected with the fungus met with in tinea tonsurans, or favus (Pt. I, 35).

3. *Atrophic*, when the condition is the result of deficient innervation, *e. g.* from injury of the nerves supplying the affected finger; under these circumstances, it is often found associated with glossy skin (**590**).

632. *Atrophy* and ridging of the nails, which are thinned and marked with ridges or transverse striæ, and in many cases somewhat opaque and brittle, are often produced during the convalescence which follows some severe illness. Atrophy.

These conditions may be compared with the imperfect development of the teeth, which often occurs as the result of disturbance of health during infancy (Pt. I, 125),

the nutrition and proper development of the nails in the one case, and of the teeth in the other, being interfered with.

A somewhat similar condition is often seen in the subjects of congenital syphilis; also in cases of long-standing paralysis of the upper extremity.

Onychia.

633. *Onychia** is the term applied to inflammation of the matrix of the nail, leading in many cases to ulceration both of this structure and also of the surrounding tissues, and being often followed by loosening and shedding of the nail itself.

Three different varieties are met with, viz.:

1. *Simple Onychia* often occurs as the result of injury, *e. g.* a crush of the end of the finger; introduction of some foreign body or irritant matter by the side of or beneath the nail; it is very frequently found in children, the subjects of the strumous diathesis, or who are in a low state of health from any cause.

It is characterised by a painful swelling of the end of the finger, affecting chiefly the matrix and soft tissues which form the margin of the nail: in many instances, ulceration of the matrix ensues, pus collecting beneath the nail, which then presents an opaque appearance and ultimately becomes loosened and very frequently cast off; at the same time, the folds of skin, which surround it, become affected with similar ulceration, and there is a constant discharge of pus from beneath and around the nail.

2. *Onychia Maligna* is the term applied to a more severe and very intractable form of the same disease, occurring usually in cachectic or strumous subjects, in some cases as the result of injury, in others without any assignable cause.

* Cf. footnote, p. 249.

The general symptoms are similar, though of a more severe character; there is the same ulceration attacking the matrix of the nail and adjacent tissues, but the end of the finger is much more swollen and inflamed, becoming of a purple or dusky colour, and assuming a characteristic, flattened, bulbous appearance; in many instances, the loosened nail, which becomes flattened out or almost concave and curled up at its edges, is almost concealed by the inflamed and swollen surrounding soft tissues, which overlap its margins.

In cases, which have been neglected, or where the disease has been in existence for some time, the subjacent bone often becomes diseased.

3. *Syphilitic Onychia:* in cases of syphilis, congenital or acquired, the matrix, root and margin of the nail may become the seat of inflammation, running on in many instances to ulceration, and presenting an appearance very similar to that met with in the simple form described above.

Onychogryphosis.

634. *Onychogryphosis* is the term applied to a condition affecting much more frequently the toes than the fingers, in which the nails, especially their central portions, become much thickened and converted into an irregular, ridged, opaque, horny growth, which projects over the ends of the fingers or toes like a claw.

Ingrowing nail.

635. *Ingrowing Nail* is the term applied to an extremely painful condition, affecting much more frequently the toes than the fingers, in which the lateral margin of the nail growing into the surrounding soft tissue sets up inflammation and ulceration; this is generally followed by a growth of spongy granulations, which project above and over the lateral margin of the nail.

In the case of the great toe, its favourite situation,

this condition is generally the result of some mechanical pressure, *e.g.* a tight boot; in the case of the finger it is generally associated with onychia (633), or some lateral hypertrophy of the nail.

Subungual Warts.

636. In some instances *warty growths* (611) "originate beneath the nail from the sensitive skin to which the nail is attached, between its free margin and the real matrix; and in their further growths they generally crop out either at the free extremity or lateral margin of the nail. Such are apt to be very painful and inconvenient."*

Agnail.

637. *Agnail* or *Hangnail*,† is the term applied to the little growth or shred of epidermal tissue which often partially separates from the skin covering the root or margin of the nail.

The little growths are very liable to be caught and torn backwards, and as the tear usually involves the corium, an inflamed and painful condition of the surrounding skin is often produced.

* 'Holmes' System of Surgery,' 3rd edit., vol. ii, p. 939.

† Derived from the Saxon, ange, signifying angry or troublesome.

CHAPTER LVI*

PARALYTIC AFFECTIONS OF UPPER EXTREMITY

Paralysis of Upper Extremity.

638. *Paralysis of the upper extremity* may be due to central causes, *e. g.* disease or injury of the brain and spinal cord, or to peripheral causes, *e. g.* disease or injury of the nerves which supply the arm.

The paralysis may vary from complete loss of motion and sensation to slight impairment of either function: it may involve the whole limb or only the parts supplied by one or more nerves.

In all cases, motor function is more readily abolished than sensory, and in cases of recovery, the return of sensation will be found to precede that of motion.

If the paralysis is long-continued or permanent, certain changes may occur in the affected parts, *e. g.* atrophy of the paralysed muscles.

Contractions of the antagonistic muscles, owing to their action being unbalanced.

Trophic affections of the skin and nails, *e. g.* glossy skin (**590**), atrophy and cracking of the nails (**632**). Patches of erythema, vesicular and bullous eruptions, sometimes rapidly appear in cases where the paralysis is due to injury to the nerves.

Cutaneous secretory affections, *e. g.* Hyperidrosis, Anidrosis (**591**).

* In this and the following chapter I have been kindly assisted by my colleague, Dr Graham Steell.

Special forms of paralysis will be met with according to the particular nerve or nerves involved, and also according to the particular form of disease of which the paralysis is an indication.

Paralysis of Special Nerves.

639. *Paralysis of the Nerves* of the upper extremity, *e. g.* of the circumflex, musculo-spiral, median, ulnar, radial, posterior interosseous, and less frequently the musculo-cutaneous, is often met with as the result either of injury or disease: in rare instances, paralysis of the whole of the nerves of the upper extremity from rupture of the brachial plexus (**647**) is produced.

Paralysis of Circumflex Nerve.

640. *Paralysis of the Circumflex Nerve* may result from injuries about the shoulder, *e. g.* severe contusions, dislocations of humerus, fractures of neck of humerus, &c.; compression from crutches; exposure to cold, neuritis; central paralysis of various kinds, *e. g.* infantile paralysis (**649**), progressive muscular atrophy (653), &c.

The symptoms are those of paralysis (**410**), followed after a time by atrophy (**411**), of the deltoid muscle.

Paralysis of Musculo-cutaneous Nerve.

(**641.**) *Paralysis of the Musculo-cutaneous Nerve* may be due to the same causes, but is less frequently met with as an independent affection.

The symptoms are impaired power of flexion of the forearm, owing to complete paralysis of the biceps and partial paralysis of the brachialis anticus, with loss of sensation along its radial border.

Owing to paralysis of the coraco-brachialis, the power of raising the humerus will also be somewhat impaired

Paralysis of Musculo-spiral Nerve.

(**642.**) *Paralysis of the Musculo-spiral Nerve* is very frequently met with as an independent affection, its exposed position as it winds round the upper arm rendering it very liable to injury in cases of wounds; but owing to its close relationship to the shaft of the

humerus, it is often injured in cases of fracture at the time of the accident, or it may subsequently become involved in the callus by which repair is effected.

Paralysis from compression, *e.g.* using crutches, lying on the arm during sleep, is not at all uncommon: in lead-poisoning (**650**), and central paralysis from various causes, the nerve is frequently involved.

The *symptoms* are as follows:

1. *In Forearm.*—There is loss of extension, therefore the forearm is flexed.

There is loss of supination (except that which is due to the action of the biceps), therefore the forearm is pronated.

There is slight loss of sensation on its posterior and outer aspect.

2. *In Wrist.*—There is loss of extension, therefore the hand is flexed; *i.e.* "wrist-drop" is produced.

3. *In Hand.*—There is loss of extension of the first phalanges, therefore the fingers are flexed at the metacarpo-phalangeal joints.

Though the 1st phalanges cannot be extended, the 2nd and 3rd phalanges can still be straightened by the action of the interossei and lumbricales* (*e.g.* if they are flexed into the palm of the hand, they can at once be straightened.)

The thumb is flexed and adducted.

There is loss of sensation on the dorsal surface of the thumb and 2½ outer fingers.†

* The action of the lumbricales and interossei is to flex the 1st and extend the 2nd and 3rd phalanges.

† Owing to the fact that the digital branches of the median nerve give off dorsal branches, which join the dorsal digital branches of the radial nerve, and are distributed to the integument over the dorsal surface of the two last phalanges of the

Paralysis of Posterior Interosseous Nerve.

643. *Paralysis of the Posterior Interosseous Nerve* may result from injury, *e. g.* wounds, dislocations of the elbow, fracture through the external condyle of the humerus, where the nerve is injured at the time of the accident, or subsequently involved in the callus by which repair is effected.

The *symptoms* are very similar to those found in paralysis of the musculo-spiral nerve (**642**), of which it is one of the two main divisions, differing, however, in the following respects:

1. *In Forearm.*—There is no loss of extension, owing to the fact that the triceps is not paralysed.

Loss of supination is not so marked, owing to the supinator longus not being paralysed.

There is no loss of sensation.

2. *In Wrist.*—The loss of extension is not so marked, owing to the extensor carpi radialis longior not being paralysed.

3. *In Hand.*—There is no loss of sensation, owing to the radial nerve not being paralysed.

Paralysis of Radial Nerve.

644. *Paralysis of the Radial Nerve* from any cause is followed by loss of sensation on the dorsal aspect of the thumb and $2\frac{1}{2}$ outer fingers.*

Paralysis of Median Nerve.

645. *Paralysis of the Median Nerve* is most commonly met with as the result of injury; less frequently from disease, *e. g.* progressive muscular atrophy (**653**), where some of the muscles of the thumb supplied by the nerve are involved at an early stage of the affection.

The *symptoms* are as follows:

1. *In Forearm.*—There is loss of pronation.

index, middle, and outer half of the ring fingers, sensation may persist in this situation in cases of paralysis of the radial nerve.

* Cf. preceding note.

2. *In Wrist.*—There is diminished power of flexion and radial adduction, since the former movement is in such cases mainly effected by the flexor carpi ulnaris, and is accompanied by ulnar adduction.

3. *In Hand.*—There is loss of power of grasp, less marked in the ring and little fingers than in the others.

Flexion of the 1st, with extension of the 2nd and 3rd phalanges, can still be effected by the interossei, and owing to the unopposed action of these muscles, the 2nd and 3rd phalanges are liable after a time to become over-extended and curved backwards.

The thumb cannot be abducted or flexed, but is permanently extended, adducted, and closely applied to the forefinger as is the hand of the ape; in fact, the thumb loses, what may be termed, its human functions, and as Duchenne calls it, the "*Ape's hand*" is produced.

Sensation may be absent in the palm of the hand on the radial side, and in the palmar surface of the thumb and 2½ outer fingers; or it may remain owing to the communications which exist between the sensory branches of the median and the other cutaneous nerves of the hand.

646. *Paralysis of the Ulnar Nerve* is often met with as the result of injury, or compression, or from other causes. Paralysis of Ulnar Nerve.

The *symptoms* are as follows:

1. *In Wrist.*—There is diminished power of flexion and ulnar adduction.

2. *In Hand.*—There is some loss of power of grasp in the ring and little fingers.

There is loss of power of moving the fingers to and fro in the same plane (owing to paralysis of the interossei).

febrile attack, or occur quite suddenly without any premonitory symptoms.

The paralysis is not progressive, it is rapidly developed and does not afterwards increase; some of the paralysed muscles soon recover their power, while in others it is never restored. After the paralysis has existed for some time, the affected muscles atrophy and waste; the temperature of the paralysed part is considerably lowered, and its nutrition becoming affected, a more or less general arrest of development may take place. The excitability of the paralysed muscles to the faradic current is rapidly diminished, and in severe cases becomes completely lost. It is found (and this is often an important point in prognosis) that when the faradic irritability is merely decreased, the muscles often recover themselves, but when it is completely lost, the paralysis is usually permanent, recovery being more prompt and complete, the less the faradic irritability is diminished.

In some cases, contractions of the limbs, leading to considerable deformity, are eventually produced, owing to the unbalanced action of the healthy over the paralysed muscles; these changes are, however, not so common, nor carried to the same extent in the upper as the lower extremities, where they so often produce some form of talipes or club-foot. For the diagnosis of infantile paralysis from syphilitic pseudo-paralysis, cf. (**416.**)

Lead Paralysis.

650. *In Lead Paralysis*, the result of chronic lead-poisoning, the extensors of the forearm are usually involved, giving rise to the condition known as "wrist-drop."

The muscle first attacked by paralysis is usually the extensor communis digitorum, and subsequently

the radial and ulnar extensors, as well as those of the thumb, also become affected; the supinator longus usually escapes, or is only involved at a late stage of the disease. The paralysed muscles undergo considerable wasting, and in many cases the veins on the back of the hand are much swollen and congested.

The paralysed muscles after a time cease to react to galvanism or faradisation, the faradic excitability being lost before the galvanic, as in peripheral paralysis generally.

Much more rarely, the paralysis begins in the muscles of the upper arm, viz. in the deltoid, biceps, and coraco-brachialis. Accompanying the loss of power and wasting of the muscles, there is often altered sensation, *i. e.* either hyperæsthesia or anæsthesia both over the paralysed muscles and also in other parts of the body.

The condition of "*wrist-drop*," or appearance produced, is somewhat similar to that seen in the wrist and hand in cases of paralysis of the musculo-spiral nerve (**642**), but in lead-paralysis the supinator longus usually escapes, and the affection is generally symmetrical, involving both limbs; other symptoms of lead-poisoning will usually be present, *e. g.* blue-line on the gums (Pt. I., **165**), intestinal colic, &c.; the history of the case, and perhaps the occupation of the patient, will also throw some light upon the nature of the affection.

Writer's Palsy.

651. In the paralytic form of *Writer's Palsy* or *cramp* (**666**), weakness and loss of power are felt in the muscles of the hand and forearm as soon as an attempt is made to write; on ceasing to do so, the weakness disappears until another similar attempt is made.

Paralysis Agitans.

652. *In Paralysis Agitans*, trembling of the muscles

of the upper extremity, usually those of the hand or forearm, is one of the earliest symptoms: at first the tremor can be arrested by an effort of the will, but after a time it is incessant and beyond control (**674**).

At a later stage, the trembling gradually abates and paralytic symptoms appear, the extensor muscles being affected to a greater extent than the flexors; rigidity of the muscles supervenes, giving rise to a characteristic deformity.

In the case of the hand, the fingers are flexed at the metacarpo-phalangeal articulations and extended at the phalangeal joints, while the thumb, which is extended, is opposed to the index finger, so that the position of the hand is very similar to that assumed in holding a pen.

In some instances, the terminal phalanges are bent, so that the appearance produced may simulate that seen in rheumatic arthritis (**576**) attacking the hand; but in these cases the characteristic joint-symptoms of the latter affection will be absent.

The elbows are usually held a little removed from the side and the forearms are somewhat flexed.

Progressive Muscular Atrophy.

653. *In Progressive Muscular Atrophy*, the wasting of the muscles, which is the chief characteristic of the disease, usually commences in one of the upper extremities (more commonly the right), either in the muscles of the shoulder, *e. g.* the deltoid, or in those of the hand, *e. g.* the interossei, or those of the thenar (opponens and adductor pollicis) or hypothenar eminences; thence it spreads, involving other parts, until almost every muscle in the body may be attacked. The course of the disease is very chronic, continuing in most cases for some years, and life is usually ultimately destroyed owing to the muscles of respiration becoming attacked.

The atrophied mucles are more or less paralysed, the loss of power being proportionate to the degree of wasting that is present; sensibility is not affected, but muscular irritability is much increased, and at an early period the affected muscles are subject to cramps and fibrillary tremors.

A peculiarity of the disease is that, while one group of muscles is attacked, a neighbouring group may be spared, and owing to the excess of action of the healthy over the atrophied and consequently weakened muscles, considerable deformity is often produced.

The electrical reaction of the wasted muscles is normal, or only very slightly affected.

In the case of the hand, owing to paralysis of the interossei, a claw-shaped appearance is produced, very similar to that seen in cases of paralysis of the ulnar nerve (**646**); while owing to the loss of power in the opponens and adductor pollicis, the thumb is extended and abducted.

Owing also to the atrophy of the interossei, deep depressions are produced in the palm of the hand, the diverging flexor tendons standing out prominently.

In the shoulder, when the deltoid is affected, the symptoms will be similar to those described: cf. paralysis (**410**) and atrophy (**411**) of deltoid.

In the forearm, there will be wasting of the front, back, and outside of the limb, according as the flexors, extensors, or supinators are involved.

Hysterical Paralysis.

654. In *Hysterical Subjects*, loss of power in the limbs is sometimes seen.

The paralysis, which may be partial or complete, involving only special groups of muscles or the whole of the limb, may be confined to one extremity, *e. g.* an arm (though much less frequently than a leg), or it

may affect one side of the body, or one arm and the opposite leg.

It may commence gradually and slowly increase in severity; or it may become suddenly developed after a hysterical attack; associated with it, there is generally more or less anæsthesia in the affected part, and other evidences of hysteria will be found. After lasting for a variable period, the paralysis may suddenly or gradually disappear, or the paralysed limb may become the seat of contracture (**667**).

The excitability of the paralysed muscles to both the faradic and galvanic currents is unaffected, even in cases where the paralysis is of long standing, a fact which is often of considerable assistance in diagnosing the cause of the loss of power.

Hemiplegia.

655. *Hemiplegia* is the term applied to unilateral paralysis, affecting usually the arm, leg, and face, the result in most cases of some lesion which has its seat in the opposite hemisphere of the brain, *e. g.* hæmorrhage, softening, abscess, tumour, embolism, &c.

In severe cases, the loss of power in the upper extremity may be complete, the arm hanging helplessly by the side; in slight cases, there may be but little loss of muscular strength, simply diminished power of grasp with slight numbness.

In cases of right hemiplegia, when the lesion involves the posterior part of the 3rd left frontal convolution of the brain, "aphasia," or loss of speech, is usually present.

In cases where the loss of power is limited to one arm, the condition is described as "brachial monoplegia."

In rare instances, *e. g.* in cases of cerebral hæmorrhage, the paralysed muscles may speedily become rigid

and contracted, "early rigidity;" in other cases the affected muscles may after some interval become the seat of "late rigidity" (**660**), or of tremors or choreiform spasms (**673**), "post-hemiplegic chorea."

656. In cases of *Paraplegia, i.e.* paralysis affecting both sides of the body symmetrically, where the disease or injury of the cord, upon which it usually depends, is situated high up, both upper extremities may become more or less completely paralysed (cf. Pt. I, 302, 303, 304). Paraplegia.

CHAPTER LVII

SPASMODIC AFFECTIONS OF UPPER EXTREMITY

Spasmodic Affections of Upper Extremity.

657. In certain affections the muscles of the upper extremity become the seat of involuntary contraction: this muscular contraction or spasm may be of two kinds, viz.:

Tonic, *i. e.* continuous, the affected muscles remaining in a state of persistent and equable contraction, which may be either temporary or permanent.

Clonic, *i. e.* intermittent, the affected muscles being alternately contracted and relaxed.

Tonic Spasm.

658. *Tonic Spasm* of the muscles of the upper extremity is met with in the following conditions:

1. Hemiplegia.

659. In rare cases of *Hemiplegia* (**655**), the paralysed muscles rapidly become rigid and contracted, "early rigidity;" much more frequently, this condition of contracture does not show itself until after some interval has elapsed, "late rigidity" (**660**).

2. "Late Rigidity."

660. "*Late Rigidity*" is the term applied to the form of contraction which (when attacking the upper extremity) often occurs in cases of hemiplegia of some standing, and which is generally dependent on descending sclerotic changes ("lateral sclerosis").

In the case of the upper extremity, flexion usually predominates over extension, and the attitude consequently assumed is as follows: the arm is pressed firmly against the side; the forearm is flexed on the arm and pronated the wrist is also flexed and the fingers

Tonic Spasm.

are closed; in some cases the fingers are extended at the first and flexed at the second and third joints. In many cases, considerable wasting of the muscles ensues from implication of the anterior horns of gray matter. At the same time there is increase of the tendon and periosteal reflexes, *e. g.* a slight tap with the edge of a stethoscope on the lower end of the radius is followed by a contraction of the biceps, and a similar tap on the lower end of the ulna or upon the tendon of the triceps, by a contraction of the latter muscle.

3. Amyotrophic Lateral Sclerosis.

661. In cases of *Amyotrophic lateral sclerosis*, the first manifestations of which usually appear in one of the upper extremities, the wasting of the muscles, the loss of power in the arm, its fixity close to the side of the body, and the pain about the shoulder, especially on any attempt to raise the arm, may cause the condition in the early stage to simulate some inflammatory affection of the shoulder or surrounding parts, the result either of injury or disease. The rapid increase, however, of the muscular atrophy, the muscular twitchings which are present, the exaggerated periosteal and tendon reflexes (**660**), the implication sooner or later of the lower extremities, and the defective articulation (the latter symptom from affection of the bulb), will usually point to the central or nervous origin of the disease.

4. Tetanus.

662. In cases of *Tetanus*, the muscles of the upper extremity are sometimes affected with tonic spasm, though not nearly so commonly as those of the trunk and legs; even in severe cases, they often escape altogether.

In some cases, "the arms are either stretched out, or fixed in a parallel line with the trunk, or drawn

across the abdomen.....the wrists and fingers are but little affected."*

In other cases, "flexion predominates over extension, and during the paroxysms the arms are drawn close to the chest, the forearm is flexed upon the arm, the hand is flexed at the wrist, and the fist is closed, the palm being directed towards the upper arm."†

The affected muscles are in a constant state of spasmodic tension, and this from time to time is roused into convulsive action; the paroxysms, which last for a variable period, a few seconds or some minutes, occur spontaneously, or may be excited by any cause of irritation, *e.g.* a draught of cold air, a sudden noise, attempts to take food, &c.

For the diagnosis from strychnia-poisoning, cf. (**663**).

b. Strychnia Poisoning.

663. In cases of *Strychnia-poisoning*, the upper extremities become affected with tonic spasm, as in cases of tetanus (**662**), but the two affections differ from one another in many important points.

In strychnia-poisoning, the convulsions usually begin in the extremities or body generally, not in the muscles of the jaw and about the neck, as in tetanus (cf. Pt. I., **116**.)

The spasm is not continuous as in tetanus, but there are intervals of complete muscular relaxation.

The symptoms develop very rapidly and are well-marked from the first, not coming on gradually as in cases of tetanus; in strychnia-poisoning, death either occurs very rapidly, within a few minutes or several hours, or else recovery soon takes place; tetanus usually extends over several days, rarely terminating fatally within twenty-four hours.

* 'A System of Surgery,' Holmes, 3rd edit., vol. i, p. 199.

† Ross, 'The Diseases of the Nervous System,' vol. ii, p. 852.

In many cases of tetanus, the hands are not affected: in strychnine poisoning they are usually tightly-clenched during the spasms.

664. *In Tetany* the muscles of the extremities, mainly those of the hand and forearm, become the seat of tonic contractions, which occur in paroxysms lasting for a variable period with intervals of remission. 6. Tetany.

When the hand is involved, it is drawn into a characteristic conical form, the thumb being adducted and the fingers flexed at the metacarpo-phalangeal joints, so that they are firmly applied to the thumb.

The hand is at the same time drawn over to the ulnar side and the arm extended.

In many cases the fingers and hand are congested, swollen, and somewhat œdematous.

The paroxysms, which may last only for a few minutes or for some hours, usually continue with varying periods of remission for a few days or for several weeks or months, and then altogether cease, leaving the patient quite free from further attacks.

Tetany frequently occurs in young children from four to six years of age, often in connection with the rickety diathesis; it is also met with about the age of puberty, and not unfrequently occurs in women in association with pregnancy and lactation; pressure upon one of the principal arterial or venous trunks or nerves of a limb sometimes induces a paroxysm. It has not been very clearly made out what causes tend to produce this affection, though exposure to cold appears in many cases to excite it; in other instances it appears to be the result of some reflex irritation, *e.g.* worms.

665. *Carpo-pedal spasm* is the term applied to the contractions of the muscles of the hand and foot which 7. Carpo-pedal Spasm.

are often seen, usually in children during an attack of laryngismus stridulus (Pt. I, **315**), or in cases of convulsions from any cause (**680**). In the case of the hand, the thumb is flexed into the palm and the fingers over the thumb; at the same time the forearm is alternately flexed and extended, and the hand constantly pronated and supinated.

8. Writer's Cramp.

666. In the spastic form of *Writer's Cramp*, the thumb and first finger, or the second and third fingers as well, become affected with tonic spasm as soon as any attempt is made to write, so that the pen is dropped, or pressed upon, or suddenly drawn away from the paper.

9. Hysteria.

667. In cases of *Hysterical Paralysis* (**654**), the affected limb frequently becomes the seat of tonic spasm or contraction; in some instances this condition appears simultaneously with the paralysis; in others it does not manifest itself until after the paralysis has been in existence for some time, the contraction showing itself either suddenly or gradually.

In the upper extremity the hand and forearm are rigidly flexed and the fingers tightly closed, so that it is often impossible to straighten them. This condition of contraction may, like paralysis, continue for a considerable period and then suddenly disappear, perhaps under the influence of some strong emotion; in cases of long standing it may be attended by considerable wasting of the affected muscles.

10. Epilepsy.

668. In *Epilepsy* at the commencement of a fit there is violent tonic contraction of the muscles throughout the body; in the upper extremity the forearm is flexed or sometimes extended upon the arm; the thumb is bent across the palm, and the fingers are flexed over it.

This stage of tonic contraction, which lasts for from two

Tonic Spasm.

to forty seconds, is succeeded by a condition of clonic spasm (679).

669. In cases of *Catalepsy* the muscles during an attack are in a state of moderate tonic contraction; the limbs remain fixed in the position in which they were at the commencement of the seizure, or in which they may be placed during its continuance. 11. Catalepsy.

This condition, which is of a rare occurrence, being usually met with in the female sex, may continue only for a few minutes, or may last for some hours or even days.

670. *Clonic Spasm* of the muscles of the upper extremity is met with in the following conditions: Clonic Spasm.

671. In cases of *Chronic Poisoning by Mercury*, the upper extremities often become affected with tremulous movements, which after a time may extend to other parts of the body. 1. Mercurial Tremors.

The tremors, which are at first slight, only coming on when the patient makes a voluntary effort, are after a time constantly present, even when the patient is asleep, assuming a jerking character, so as to interfere with and render impossible all delicate manipulations.

Associated with the tremor there is usually altered sensation, *e.g.* a feeling of numbness in the parts, and neuralgic pains are often present in the elbow and fingers; more or less muscular weakness, but not distinct paralysis, is generally present, and there will generally be a history of exposure to the poison, and of other evidences of mercurialism, *e.g.* mercurial stomatitis and salivation (Pt. I, 164).

672. In cases of *Chronic Lead-poisoning* (650), tremulous movements, often limited to the muscles of the upper extremities, are sometimes met with. 2. Lead-poisoning.

673. In cases of *Chorea*, the earliest evidences of the 3. Chorea.

Clonic Spasm.

irregular clonic spasm characteristic of the disease are usually seen in the muscles of the hand and forearm, which are generally involved simultaneously with those of the face.

At first there are simply slight jerking movements of the fingers and hand, with pronation of the wrist, appearing only when the patients are excited, or have their attention directed to the part; *e.g.* if they are told to stand and hold out the arm, keeping it perfectly still.

After a time the spasms become much intensified, being constantly present, even during repose, but usually ceasing during sleep. In severe cases, the whole of the upper extremity is affected; *e.g.* the shoulders are constantly elevated, depressed, and drawn forwards or backwards; the arms are thrown about in all directions; the hand is continually pronated, supinated, flexed, or extended; the fingers are at one moment extended and spread apart, at another flexed into the palm. In many instances, all voluntary movements are rendered impossible.

In most cases, both upper extremities are involved, as the spasm is usually general, affecting all the voluntary muscles throughout the body. In exceptional instances, the spasm is unilateral, one side only of the body being implicated.

Towards the termination of the affection, or during its course, the choreic movements are sometimes replaced by more or less complete paralytic symptoms, affecting either one or, more rarely, both sides of the body.—"Choreic Hemiplegia," or "Paraplegia." Cf. also "Post-Hemiplegic Chorea" (**655**).

4. Paralysis Agitans.

674. In *Paralysis Agitans*, trembling of the muscles of the upper extremity, usually those of the hand and

forearm, is one of the earliest symptoms of the disease. In the early stage, the tremor can be arrested by an effort of the will, but after a time it becomes incessant and altogether beyond control.

Its nature is usually very characteristic; "the thumb moves over the fingers, as when a pencil or paper-ball is rolled between them; in others, the movements are more complicated, and resemble what takes place in crumbling a piece of bread" (Charcot). At the same time the hand is constantly flexed and extended on the forearm, and the forearm upon the arm, the elbows being removed from the chest.

At a later stage the tremor disappears, and rigidity of the muscles supervenes (**652**).

5. Multiple Sclerosis.

675. In *Multiple Cerebro-spinal Sclerosis* the upper extremities become affected, first with a gradual paresis or loss of power, and afterwards with well-marked tremulous movements, ceasing during rest, and only present when the parts are called into voluntary action.

There is for a time no wasting of the muscles, but the periosteal and tendinous reflexes (**660**) are much exaggerated.

It differs from paralysis agitans (**674**), with which it is liable to be mistaken, in the younger age of the patients, being rarely met with in persons over 35 years of age, and being especially common in young subjects; and from both paralysis agitans and chorea (**673**) in the fact that the tremulous movements disappear when the parts are at rest, only occurring during some voluntary action.

6. Delirium Tremens.

676. In cases of *delirium tremens*, tremor of the fingers and hand, usually most marked in the morning, is one of the earliest premonitory symptoms of the

affection. During an actual attack the tremor becomes much intensified.

7. Writer's Cramp.

677. In the tremulous variety of *writer's cramp* (**666**), which is of rare occurrence, distinct trembling attacks the hand and forearm as soon as any attempt is made to write.

8. Athetosis.

678. *Athetosis* is the term applied to an affection of the fingers and toes, described by Hammond, occurring frequently in imbecile children or in patients who have suffered from hemiplegia (**655**), or who are the subjects of some central nervous disease.

It is characterised by a continuous slow movement of the fingers and toes, which may, after a time, extend to the hand and foot.

The fingers, which the patient is unable to hold in a fixed position, become more or less distorted; the muscles of the hand may atrophy, but, as a rule, no paralysis is present. In many instances the affected part presents evidence of vaso-motor disturbance, the fingers being red, or moist, or colder than usual.

One extremity only may be affected, or the condition may be bilateral, and under these circumstances it is often associated with idiocy.

9. Epilepsy.

679. In *epilepsy* the condition of tonic spasm, which is present at the commencement of a fit (**668**), is immediately followed by one of clonic spasm, involving the muscles of the whole body, but usually more marked on one side than the other; in consequence the extremities, both upper and lower, are violently convulsed and thrown about in all directions.

This condition usually lasts for three or four minutes, but it may vary from a few seconds to ten minutes.

In cases where epileptiform seizures ("Jacksonian epilepsy") are dependent upon some traumatic lesion of

the brain (*e. g.* after fracture of the skull), or upon disease (*e. g.* a gumma) involving its cortical substance, the convulsions, which are often limited to one half of the body, usually commence in the hand. In these cases consciousness is either preserved throughout the attack, or only lost towards its termination.

When the spasms are limited to the arm the condition is termed "brachial monospasm;" when commencing in the arm, and afterwards extending to other parts, *e. g.* the face and leg, "brachial protospasm."

10. Convulsions.

680. In *convulsions*, from any cause, *e. g.* reflex (from irritation of the alimentary canals, worms, dentition, &c.), uræmic, puerperal, &c., the upper extremity is involved in the condition of clonic spasm which attacks the whole body. Cf. (**665**).

CHAPTER LVIII

CONGENITAL DEFORMITIES OF UPPER EXTREMITY

Congenital Malformations.

681. *Congenital malformations* of various kinds are met with in the upper extremities, *e. g.*—

1. There may be complete absence of the entire upper extremity on one or both sides.

2. There may be absence of an intermediate portion of the upper extremity, so that the hand is attached directly to the shoulder.

3. All the parts may exist, but the limb may be shortened and generally atrophied.

4. One only of the bones of the forearm (either radius or ulna) may be absent or imperfect, and under these circumstances some of the bones of the carpus and metacarpus will probably be found wanting.

5. The arm or forearm may be truncated, *i. e.* terminate abruptly at some point like a stump.

In some cases this deformity appears to be due to arrested development; in others to spontaneous or intra-uterine amputation, the result of pressure caused by the umbilical cord, or by bands or adhesions forming in utero and constricting the limb.

The fact that in some cases the separated portion of the arm has been found lying loose in the uterus, and that the stump of the limb was only partially healed, would appear to prove the latter view.

6. Congenital dislocations of the shoulder, elbow, and wrist are sometimes met with.

682. *Club-hand.*—In rare instances the hand is the seat of a congenital deformity, somewhat analogous to that met with in the foot in cases of talipes or club-foot. Club-hand.

In some cases the fingers are found extended; more commonly they are flexed, and at the same time slightly drawn over towards the ulnar side.

683. *Hypertrophy*, with more or less deformity of one or more of the fingers, is sometimes present at birth, and it is often found that as the child grows the affected fingers increase in size more rapidly than the others, so that considerable deformity is produced. Hypertrophy of Fingers.

This condition may depend upon general hypertrophy of all the structures entering into the formation of the finger, or it may be due simply to excessive development of adipose tissue.

The upper extremity may in other respects be perfectly normal, or it may be similarly hypertrophied, or affected with some other deformity.

684. *Deficiency* in the number or size of the fingers is sometimes present at birth. Deficiency of Fingers.

In some cases one or more of the fingers of one or both hands are completely wanting; in other cases there may simply be an absence of one or more of the phalanges, the remaining ones being perfectly developed or more or less atrophied.

685. *Supernumerary fingers* may occur under four forms:* Supernumerary Fingers.

1. As a rudimentary digit, attached loosely or by a narrow pedicle to the hand or to another finger.

2. As a more or less developed digit, articulating with the head or side of a metacarpal bone or phalanx, which is common to it and another finger.

* Annandale, op. cit., p. 26.

3. As a fully-developed digit, having its own metacarpal bone and phalanges distinct.

4. As a more or less developed digit, intimately united along its whole length to another finger, and having either an additional metacarpal bone of its own, or articulating with the head of one which is common to it and another finger.

As a general rule, only one supernumerary digit is found, though in exceptional cases, the number may be greater.

Congenital Union of Fingers.

686. *Congenital union of the Fingers* may occur under four forms.*

1. By loose folds of skin only, the true "webbed fingers."

2. By a more intimate connection of the skin and deeper soft tissues.

3. By the union or fusion of bones as well as of the soft tissues.

4. The fingers may all be massed together into one lump, so that it is almost impossible to distinguish the individual ones.

In all these forms, a portion only or the whole of the length of the finger may be involved.

Congenital Contraction.

687. *Congenital Contraction* of one or more fingers, due to the shortening of muscles or bands of fascia is occasionally met with, in some cases in connection with club-hand, in others occurring as an independent affection.

In many instances, the contraction is very slight at birth so that it often escapes notice, becoming more marked as the child grows older.

Congenital Dislocation.

688. *Congenital Dislocations* of the fingers at the

* Annandale, op. cit., p. 46.

metacarpo-phalangeal or phalangeal joints are of rare occurrence.

689. The following tumours have been found growing in connection with the fingers at birth, viz. pedunculated growths or excrescences of the skin; fatty, fibrous, and cartilaginous growths.* Congenital Tumours.

* Annandale, op. cit., p. 67.

CHAPTER LIX

INJURIES OF THE DORSAL SPINE

Injuries of Dorsal Spine.

690. The injuries to which the dorsal portion of the spinal column is subject are sprains or twists (**691**), dislocations (**692**), fractures (**693**), and concussion (**694**).

Sprains.

691. Severe strain or stretching, and even laceration, of the ligaments and muscles connecting together the dorsal vertebræ, is followed by pain and aching in the back, more or less swelling or fulness over the affected part, along with stiffness and impaired movement, especially upon attempts to stoop or bend forwards.

Dislocation.

692. Pure *dislocation* of the dorsal portion of the spine is for anatomical reasons of extremely rare occurrence, the vertebræ articulating with one another in such a manner and being so intimately connected together by ligaments and muscles, that it is almost impossible for this injury to occur unless associated with fracture (**693**). The last dorsal vertebra has, however, in a few instances been found dislocated from the first lumbar without any fracture being present.

Fracture.

693. *Fractures* of the dorsal vertebræ are frequently met with, though not so commonly as in the cervical portion of the spine; they may result from direct violence, *e.g.* a blow or fall upon the back, or from indirect violence, *e. g.* a forcible bending forwards or backwards of the spinal column.

The fracture may involve the body or arch of the vertebra, or the whole or a portion of the spinous process only may be broken off; in the former case, the fracture will usually be complicated by more or less displacement or dislocation of the affected vertebræ.

When the *spinous process alone* is involved, the only symptoms of fracture may be irregularity in the line of the spinous processes, crepitation, stiffness, pain especially on movement, ecchymosis, and swelling about the seat of injury; along with these symptoms, there may be more or less evidence of concussion of the spine (**694**).

When the *arch or body of the vertebræ* are involved and displacement of the fragments is present, there is often slight deformity, *i. e.* a depression or prominence with more or less irregularity at the seat of fracture; as a rule, unnatural mobility and crepitation cannot under these circumstances be detected.

In most cases, owing to compression of the spinal cord by the displaced bone or by blood extravasated into the vertebral canal, more or less paralysis of the parts supplied by nerves given off below the seat of fracture is present.

When the displacement of the fragments is slight, the parts below the seat of injury may be only partially paralysed; under these circumstances, considerable pain is generally experienced at the seat of fracture, and hyperæsthesia is often found to exist at the line of junction of the paralysed and sound parts of the body, owing to compression and irritation of the nerves that issue from the intervertebral foramina at the seat of fracture.

If the *lower dorsal vertebræ* are involved, there will be loss of motion and sensation, more or less complete, in

the lower extremities and also in the trunk as high as the parts supplied by nerves given off below the seat of fracture. In addition, owing to paralysis of the sphincter ani, there will be incontinence of flatus as well as of fæces; owing to paralysis of the muscular coat of the bladder, there will at first be retention of urine followed after a time by incontinence, the result of overflow from an over-distended bladder; in the course of a few days, evidences of cystitis usually appear, and the urine becomes ammoniacal and alkaline in reaction.

Owing to paralysis of the vessels of the penis, priapism is not uncommonly present.

As the result of paralysis of the muscles of the abdominal walls, the stomach and intestines, losing their natural support, become tympanitic and distended with gas.

The temperature of the paralysed part varies, being in some cases much higher than normal, while in other cases it is considerably lowered.

The nutrition of the paralysed parts soon becomes impaired, bedsores often rapidly form, especially over places which are subjected to pressure as the patient lies in bed.

The patient gradually falls into a condition of extreme cachexia, and death usually ensues after some months, in some cases sooner, and in other cases not for a year or more, either from bedsores and extensive sloughing, or from a low form of inflammation attacking the mucous membrane of the urinary tract.

If the *upper dorsal vertebræ* are involved, there is, in addition to the same symptoms, more or less interference with breathing, owing to paralysis of the respiratory muscles, mainly the intercostals: as a consequence,

inspiration is mainly diaphragmatic, while expiration is very imperfect being mainly effected by the elasticity of the chest walls and lungs.

The result of this is that a gradual process of asphyxia, owing to imperfect aëration of the blood, sets in, a low form of pulmonary congestion is produced, and death as a rule ensues in from three to four weeks.

Concussion of Spine.

Concussion of the Spine is the term applied to a condition in which as the result of injury usually unattended by any fracture or dislocation of the vertebræ, the functions of the spinal cord are partially or completely suspended, in some cases only temporarily, in others permanently.

As regards the pathology of concussion, it may in some cases possibly depend upon a simple jar or shaking of the cord unattended by any obvious lesion: in the majority of cases there is, however, in all probability some visible lesion of the cord or its vessels, either contusion of its substance or minute extravasation of blood into its interior; or again, it may depend upon external compression of the cord from effusion of blood or from inflammatory exudations poured out upon its surface.

The symptoms vary very much in different cases, *e.g.* from temporary and slight loss of motion and sensation to paralysis more and less complete, in some instances almost as well marked as in cases of fracture.

In a large number of cases, there is not complete paralysis but simply slight loss of power in the lower extremities, with a feeling of numbness or tingling and occasional twitchings in the limbs, the sensibility of which may be increased, diminished, or altogether unaffected.

In many instances, the bladder is involved, there being

either delay and difficulty in micturition, or on the contrary an irritable condition of the viscus, so that micturition is more frequent than usual.

General symptoms are also often present, *e.g.* restlessness, nervousness, confusion of thoughts, insomnia, defective vision, more or less prostration, with in some cases nausea and occasional attacks of vomiting.

It will be often found that these symptoms do not immediately follow the receipt of the injury, but an interval of variable duration may intervene, during which the patient is frequently able to go about and perhaps follow his ordinary occupation; then after a time, perhaps a few weeks, or possible one or two months or even longer, they gradually begin to manifest themselves.

In some cases, the patient may completely recover after a variable period; in others, the general health and condition are permanently impaired, or the patient is left more or less completely paralysed; while in the worst cases, the symptoms gradually increase in severity and death may eventually result.

CHAPTER LX

AFFECTIONS OF THE DORSAL SPINE

Caries of Spine. Angular Curvature.

695. Chronic inflammation of the bodies of the dorsal vertebræ, leading in many cases to caries and destruction of the affected bones, is very frequently met with, especially in young subjects, who present evidences of the strumous diathesis, or in those who are in a low state of health from any cause; in many instances, the disease follows the receipt of an injury, or it may show itself spontaneously without any evident exciting cause.

In some cases, caries is attended by suppuration and the formation of an abscess (cf. below); in others, extensive destruction of the vertebræ may take place without any evidence of suppuration attending the process.

The *earliest* symptoms of caries of the dorsal vertebræ are as follows:

1. *Stiffness and rigidity of the back*, so that the patient keeps it constantly fixed in a certain position; if the movements of the patient are observed, it will be seen that they are restrained and performed with unnatural stiffness.

In picking up an object from the ground, instead of bending the back, it will be held rigidly perpendicular, and the object will be reached by bending the knees and thighs until the hand touches the ground. In rising up again, or in turning round, similar precau-

tions will be taken to prevent any flexion or rotation of the spine.

2. *Pain*, at the seat of disease or radiated to some distant part, either constant or paroxysmal, and increased upon certain movements, *e. g.* on a sudden jar or shock; or running downstairs; jumping from a chair on to the floor; on a sudden cough, or sneeze, &c.

Pain will also be experienced on rotating or pressing upon the shoulders or head, and in some cases on tapping or applying a hot sponge to the affected portion of the spine.

Owing to the irritation of the dorsal nerves, as they pass out of the intervertebral foramina, pain is often referred to the walls of the thorax (and in some cases, constant cough is present), or to the pit of the stomach; when the latter symptom only is present, it not unfrequently happens that the spinal mischief is altogether overlooked, and the case treated simply as one of disorder of the digestive organs. In order to ease the pain, some device is often present for relieving the spine of the weight of the head and shoulders, so as to take off pressure from the inflamed portion of bone, *e. g.* the patient often rests the head or chin upon a chair, or supports the shoulders by resting the elbows upon a table, or by making the arms serve as props upon the thighs. In other cases, a feeling of constriction about the abdomen, as though a cord was tied round it, is complained of.

In the *later* stages, when the disease is more advanced, some of the following symptoms will be observed, *i. e.*

3. *Angular curvature* (Pott's curvature), or undue prominence of the spines of the affected vertebræ, the result of destruction and falling together of their

bodies; this is usually a more prominent symptom in the dorsal than in the lumbar region, owing to the fact that in the former situation, the natural curve of the spinal column is backwards, while in the latter it is forwards; in exceptional cases, where caries affects chiefly the sides of the bodies of the vertebræ, there may, instead of angular, be a lateral curvature of the affected portion of the spine, or perhaps more frequently a combination of both these conditions (**698**).

4. *Thickening* of the soft tissues over the affected vertebræ.

5. *Slight increase of temperature* over the affected portion of the spine.

6. *Abscess:* when suppuration occurs in connection with disease of the dorsal portion of the spine, the pus usually makes its way in the direction of least resistance, *i. e.* downwards in front of, or by the side of, the bodies of the vertebræ, taking one of three courses, *e.g.*

a. Psoas Abscess: the pus, making its way into the sheath of the psoas, may follow the course of the muscle and point at the upper and inner part of the thigh, or, at some spot lower down in the course of the leg; or, leaving the course of the psoas in the pelvis, it may present in the perinæum, or make its way through the sciatic notch into the gluteal region, giving rise to one form of gluteal abscess.

b. Lumbar Abscess: the pus, making its way backwards below the last rib, may penetrate the quadratus lumborum and point behind, between the last rib and the crest of the ileum; or, burrowing downwards over the dorsum ilii, it may point in the gluteal region, appearing as a gluteal abscess.

c. Iliac Abscess: the pus, instead of pointing behind, may burrow anteriorly between the abdominal

muscles, and point in the groin, frequently at some spot just above Poupart's ligament.

In exceptional cases an abscess in connection with disease of the dorsal vertebræ may burst into the lung, or make its way directly backwards between the ribs, pointing over the spine.

7. *Sinuses* are sometimes found in the later stages after an abscess has burst, and are, therefore, usually present in one of the above situations.

8. *Paraplegia*, or loss of power in the lower extremities, is often present. This may vary from slight weakness to complete paralysis, involving not only the lower limbs, but also the bladder and rectum; at the same time there are often cramps and convulsive movements in the legs, with various abnormal sensations, *e. g.* pricking, tingling, numbness, &c.

The paralysis, which in some cases is permanent, in others only temporary, may be due to pressure upon the cord by the displaced vertebræ; but, inasmuch as it often appears in cases when the deformity is only slight, it is probable that in these cases the posterior surfaces of the bodies of the vertebræ are mainly affected, and that the implication of the cord is due to inflammatory changes occurring in it, and producing thickening of its membranes (pachymeningitis).

9. *Changes in the shape of the Thorax* are sometimes present. In cases where the curvature is considerable, owing to extensive destruction of the bodies of the dorsal vertebræ, the thorax becomes altered in shape, *e. g.* its diameter from above downwards is diminished, while its antero-posterior diameter is increased in length, so that the sternum is rendered unduly prominent. In some cases its lateral diameter also is increased, consequently, though the shape of the thorax

is altered, there is not, as a rule, much diminution in its vital capacity.

Caries of Spinous or Transverse Processes.

696. Caries or necrosis, may attack primarily the tips of the spinous processes, less frequently the transverse processes of the vertebræ. Under these circumstances a more or less painful tender swelling will probably appear over the affected portion of the spine, which will be held rigid and fixed; in many cases an abscess will form, and if this bursts and discharges posteriorly, a sinus will be left leading down to the diseased bone, which can often be felt with a probe.

The caries may remain limited to these parts, or it may extend and involve the bodies of the vertebræ (695).

Lateral Curvature.

697. In most cases of *lateral* or "*rotation*" *curvature of the spine* (*scoliosis*) (Pt. I, **309**), two well-marked curves are present, an upper one forming a long arc in the dorsal region, and a lower one forming a short arc in the lumbar region.

The convexity of the dorsal curve usually looks towards the right, that of the lumbar curve in the opposite direction, *i. e.* towards the left.

If the curvature of the spine is well marked, changes will be produced in the walls of the thorax, giving rise to considerable deformity.

On the side of the convexity (*i. e.* on the right side in most cases) the following condition will be found, viz.

The ribs are unusually prominent behind, especially at their angles, consequently the right side of the chest, viewed posteriorly, is remarkably protuberant; on the other hand, the anterior extremities of the ribs and costal cartilages, viewed from the front, are flattened or depressed.

The heads and shafts of the ribs are separated from one another by a greater space than usual, so that the intercostal spaces are widened.

The scapula is not only raised above its ordinary level, but it also projects unduly backwards, its posterior border being often raised from the ribs, owing to the walls of the chest on this side being more bulging than is natural; consequently the corresponding shoulder is high and prominent; this "growing out" of the shoulder, as it is commonly termed, is often the first symptom to attract attention.

In severe cases considerable displacement backwards of the sternal extremity of the clavicle is often produced, associated with great exaggeration of its normal curvature.

The spinal muscles are usually somewhat prominent, being displaced and twisted, and pushed outwards by the bulging of the ribs; the scapular muscles are often similarly affected, and the fulness or prominence produced in this way may, in some cases, at first sight simulate the presence of a tumour.

In the lumbar region, the distance between the last rib and the crest of the ilium is much diminished, so that in some cases they may almost touch each other; as a consequence, considerable falling in of the flank is often produced.

On the side of the concavity (*i. e.* on the left side in most cases), the opposite condition will be found, viz. the ribs are flattened and depressed behind, consequently the left side of the chest, viewed posteriorly, is remarkably contracted; on the other hand, the anterior extremities of the ribs and costal cartilages, viewed from the front, are unduly prominent.

The heads and shafts of the ribs are approximated,

so that the intercostal spaces are considerably narrowed. The scapula, owing to the flattening of the side of the thorax, falls downwards and away from the ribs; consequently the shoulder on this side is somewhat lowered and sloping.

In the lumbar region, the distance between the last rib and crest of the ilium is increased, and the hip on the same side is usually somewhat prominent and thrown out.

Owing to the changes produced in the shape of the chest, its capacity is in severe cases considerably diminished, and a marked displacement of both the thoracic and abdominal viscera is often produced.

As a general rule, lateral curvature of the spine develops itself very insidiously, without any pain or other symptom, beyond a feeling of weakness or aching in the back, to direct attention to the part, and in many instances the "growing out" of the shoulders is the first symptom that attracts notice.

In some cases, however, tenderness on pressure, or pain of a neuralgic character, is complained of over the back in the early stage, and this may occasionally cause difficulty in distinguishing between lateral curvature and commencing caries of the spine, but the different character of the pain, and the absence of rigidity and the other symptoms associated with caries (**695**), will usually assist in diagnosing between the two affections.

For other forms and causes of lateral curvature of spine, cf. (**698**).

Curvature of Spine.

698. *Curvature* of the dorsal portion of the spine may be due to several causes, appearing under three chief forms.*

* *Kyphosis* is the term applied when the curvature is in an

1. *Angular Curvature*, or Pott's disease, due to caries of the bodies of the vertebræ (**695**).*

2. *General Bowing*, or arching backwards, may be due to various causes.*

a. Rickets, owing to simple relaxation of the ligaments and a weakened condition of the muscles which support and connect together the vertebræ.

b. Old age or simple debility, owing to the same cause.

c. Rheumatic arthritis or spondylitis deformans, cf. (Pt. I, **305**).

d. Ostitis deformans, cf. (Pt. I, **308**).

3. *Lateral Curvature*, usually due to simple relaxation from general weakness of the spinal ligaments and muscles (**697**);* it may also be produced in cases where collapse of the walls of the thorax has taken place from any cause, *e.g.* in cases of pleurisy, empyema, &c., also in cases of shortening of either lower extremity from any cause, *e.g.* morbus coxæ, infantile paralysis, genu valgum, &c., the obliquity of the pelvis causing a lumbar curve, and this being compensated for by a dorsal curve in the opposite direction.

antero-posterior direction, as in angular curvature or in general bowing.

Scoliosis is the term applied when the curvature is lateral.

Lordosis is the term applied to the curving forwards of the lumbar portion of the spine, producing undue hollowness of the loin.

* In cases of Thoracic Aneurism (783) from absorption of the bodies of the vertebræ, and in cases of Malignant Disease of the same parts (*e.g.* Sarcoma, Carcinoma, 701) from softening and absorption of their substances, a certain amount of curvature of the spine may be produced; in some cases this is mainly lateral, or associated with more or less general bowing; less frequently, a distinct angular curvature appears.

In exceptional cases of caries (**695**) affecting chiefly one side of the bodies of the vertebræ, a lateral displacement may be produced instead of the ordinary angular curvature backwards, but under these conditions, a certain amount of displacement backwards is usually present as well, and the lateral curve is always limited, being confined to the affected vertebræ, instead of involving the whole column, as in true lateral curvature.

Rigidity of Spine

699. *Rigidity or Stiffness* of the dorsal portion of the spine may be due to various causes, viz.

1. It may follow an *injury*, *e. g.* a sprain, dislocation, or fracture of the spine (**690**), &c.

2. It may be due to simple *muscular contraction*, *e. g.* in the early stage of caries (**695**), before anchylosis has taken place, stiffness and rigidity of the back, owing to simple contraction of the spinal muscles from reflex irritation, is always a prominent symptom.

3. It may be due to *changes in the bones* themselves, *e. g.* in anchylosis of the bodies of the vertebræ in caries (**695**); in rheumatic arthritis (Pt. I, **305**), where deposits of new bone are thrown out round about the bodies and articular processes of the vertebræ; also in ostitis deformans (Pt. I, **308**), where in addition to the hardening of the fibrous and ligamentous structures, the bones may become hypertrophied and in some cases anchylosed together.

Hyperostosis.

700. *Hyperostosis* or enlargement and thickening of the dorsal vertebræ is sometimes met with, as in the case of the cervical portion of the spine (Pt. I, **312**).

Sarcoma and Carcinoma.

701. *Sarcoma and Carcinoma* may attack the dorsal vertebræ as in the case of the cervical (Pt. I, **312**, *a*).

Spina Bifida.

702. *Spina Bifida* is much more frequently met with

in the dorsal region of the spine, especially at its lower part, than in the cervical.

The general symptoms and appearance of the tumour will be similar to those described (Pt. I, **311**).

Bifid Dorsal Spines.

703. In rare instances, the spines of the dorsal vertebræ are bifid or bifurcated, owing no doubt to non-coalescence of the two secondary centres of ossification, which develop at about the sixteenth year at the tip of each spinous process.

Opisthotonos. Emprosthotonus. Pleurosthotonus.

704. *Opisthotonos* is the term applied to the arching backwards of the spine, so that the patient rests on the back of the head and the sacrum or heels, sometimes seen in cases of tetanus (**662**), or strychnia-poisoning (**663**), as the result of tonic contraction of the muscles of the spinal column.

Emprosthotonos is the term applied to the opposite condition, when the body is bent forwards.

Pleurosthotonos is the term applied, when the spine is curved laterally.

CHAPTER LXI

ABNORMALITIES IN THE SHAPE OF THE CHEST

705. THE chief abnormalities met with in the shape of the chest may be arranged as follows: Abnormalities in Shape of Chest.

I. *Bilateral and Symmetrical.*

1. Developmental Abnormalities.
   - *a.* The Alar Chest (**706**).
   - *b.* The Flat Chest (**707**).
   - *c.* The Pigeon Chest (**708**).
   - *d.* The Rickety Chest (**709**).
2. Abnormalities due to Emphysema (**710**).

II. *Unilateral Irregularity of Form.*

1. Expansion (**711**).
2. Retraction (**712**).

III. *Local Irregularity of Form.*

1. Bulging (**713**).
2. Depression (**714**).

706. The *Alar Chest.*—In the alar, or winged chest, the ribs are very oblique and the intercostal spaces wide, consequently the thorax is elongated vertically, while its antero-posterior diameter is diminished; the shoulders droop, and the scapulæ are tilted up behind like wings, hence the term "alar" chest. Alar Chest.

707. The *Flat Chest.*—In this variety, the chest is simply flattened from before backwards, so that its antero-posterior diameter is diminished. Flat Chest.

These two forms, the alar and flat chests, are fre-

quently associated together, and when present, they are usually regarded as indicating a tendency to phthisis.

Pigeon Chest.

708. The *Pigeon Chest.*—In the pigeon chest, the ribs on either side in front of their angles are flattened or depressed, while the sternum is pushed forwards; consequently a transverse section of the chest would be triangular, with the base behind between the angles of the ribs, and the apex in front at the sternum.

This condition is usually the result of obstruction to the entrance of air into the chest from any cause, when the parietes are weakened or possess little resistance, *e. g.* in infancy, in cases of chronic enlargement of the tonsils, in croup, hooping cough, bronchitis, &c.

In these cases, the entrance of air into the lungs during inspiration being more or less prevented, the external atmospheric pressure is not balanced by the air in the chest; consequently, the walls of the thorax yielding and falling in become compressed from side to side in front of the angles of the ribs, and the above deformity is produced.

Rickety Chest.

709. The *Rickety Chest* resembles somewhat the pigeon chest (**708**), the sternum being unusually prominent, but on transverse section, its outline instead of being triangular presents on either side a double curve.

Its characteristics are as follows:

1. The sternum is unusually prominent, so that its antero-posterior diameter is increased.

2. On either side of the sternum, *i. e.* on the antero-lateral aspect of the chest, and corresponding with the position of the costo-chondral articulations, there is a well-marked longitudinal groove, commencing above, about the 2nd or 3rd ribs, and running downwards and outwards on either side as far as the 9th or 10th ribs.

3. The ribs bend sharply at their angles and make a short curve forwards: they then turn inwards, also with a slight curve, to the costal cartilages (where there is a distinct depression), without forming their natural arch.

4. At the bottom of the longitudinal groove or a little to one side of it, the nodular swellings produced by the "beading" (**740**) of the ends of the ribs can often be felt or seen beneath the skin.

5. On a level with the xiphoid cartilage, there is often a transverse groove or constriction, as though a string had been tied round the chest, its lower part, *i. e.* that below the groove, appearing to be pressed unduly outwards.

Causation of the deformity. The changes produced in the shape of the thorax are mainly the result of the pressure of the external air acting upon the ribs, which in rickets are abnormally soft and yielding.

In a healthy chest, this pressure is counterbalanced by the resistance or natural resiliency of the chest-walls, aided by the force of the inspired air.

In rickets, the resistance offered by the softened ribs being greatly reduced, the chest walls yield to the atmospheric pressure during inspiration, sinking in at the point where they are weakest, *i.e.* at the junction of the ribs with the costal cartilages: consequently a distinct groove or depression is produced at this spot, and as a result, the sternum is displaced bodily forwards.

The transverse constriction is partly due to the action of the diaphragm pulling inwards the portions of the ribs to which it is attached, partly to the enlarged liver and spleen (often present in rickets), pushing out the lower ribs.

The pressure of the arms upon the softened chest walls also is said to assist in producing the lateral depression.

Chest in Emphysema.

710. In cases of *Pulmonary Emphysema* the chest may become much expanded, so as to assume a characteristic "barrel-shape:" the sternum is pushed forwards and often curved from above downwards; the ribs lose their normal obliquity and the intercostal spaces are widened: the antero-posterior diameter of the chest is much increased and may even exceed the transverse.

Unilateral Expansion of Chest.

711. *Unilateral Expansion of the Chest* may be due to various causes, *e. g.*

1. In connection with the pleura. Pleurisy (**779**). Empyema (**780**). Pneumothorax (**775**). Hæmothorax (**777**).

2. In connection with the lung. Malignant growths of the lung (**782**). Hypertrophy or distension of one lung, when its fellow is rendered incapable or is collapsed from any cause, *e. g.* pleuritic effusion, &c.

3. Mediastinal tumours (**782**).

Unilateral Retraction.

712. *Unilateral Retraction* of the chest may be due to various causes, *e. g.*

1. Pleurisy, where the effusion having been absorbed or removed, the lung has failed to expand.

2. Collapse of the lung from pressure on its bronchus.

3. Changes in the lung itself, diminishing its volume and power of expansion, *e. g.* cancer of lung, cirrhosis of lung, fibroid phthisis, &c.

Local Bulging.

713. *Local Bulgings* of the chest walls may be due to various cases, *e. g.*

1. Connected with the soft tissues—*cf.* tumours or swellings of soft tissues of walls of thorax (**725**).

2. Connected with the chest walls (ribs and ster-

num)—*cf.* tumours or swellings of sternum and ribs (749) (743).

3. Connected with the pleura.

a. Localised pleuritic effusions (779).

b. Empyema pointing on the surface (780).

c. Localised pneumothorax (775).

4. Connected with the lung.

a. Pneumonia at the base or apex.

b. Localised emphysema.

c. Hernia of the lung (781).

d. Tumours of the lung (782).

5. Connected with the heart and pericardium.

a. Pericardial effusion.

b. Hypertrophy or aneurism of the heart.

6. Connected with the large vessels.

Aneurism of the aorta (783) and large vessels at the root of the neck (Pt. I, 260).

7. Enlargement of the liver or spleen.

8. Mediastinal tumours(782—784).

Local Depression.

714. *Local Depressions* of the chest walls may be due to various causes, *e. g.*

1. Connected with the pleura—pleuritic adhesions.

2. Connected with the lung—any of those causes, which produce general unilateral retraction (712), may cause a local depression when the influence is confined to a limited area only.

In most cases of phthisis, more or less depression of the infra-clavicular region is generally present.

3. Congenital deficiencies of the chest walls (746), (754).

4. Local injuries, *e. g.* fractures of the ribs or sternum, &c.

Deformity in Spinal Disease.

715. *Deformity in Spinal Disease.*—In cases of curvature of the spine, angular (695) or lateral (697),

considerable deformity is often produced in the thorax, some portions of its walls being depressed, while others are rendered unusually prominent and bulging.

CHAPTER LXII

AFFECTIONS OF WALLS OF THORAX (SOFT TISSUES)

Varicose Veins.

716. *Varicose Veins.*—A varicose condition of the veins of the thoracic walls is sometimes seen in cases of obstruction to the return of blood from this region, *e. g.* in cases of mediastinal tumours (**782**) pressing upon the large venous trunks, vena cava, innominate, or subclavian veins, &c.

Under these circumstances, the superficial veins of the chest walls often become much dilated, standing out prominently beneath the skin, and presenting characters similar to those described (**504**).

Œdema.

717. *Œdema* of the chest walls is sometimes seen as the result of the same condition, but it is far more commonly met with in cases of general dropsy, *e. g.* in renal disease; also in cases of empyema (**780**), and abscess (**726**), &c.

Emphysema.

718. Emphysema of the chest walls, cf. (**774**).

Cutaneous Eruptions.

719. *Cutaneous Eruptions.*—The chest walls may become affected with most of the cutaneous eruptions described as attacking the upper extremity (Chap. XLIII). The front of the chest is a favourite situation of the early syphilitic eruptions, *e. g.* roseola (**482**); lichen (**484**); psoriasis (**485**); also of chloasma (**720**), as well as of the various exanthemata. The lateral aspects of the chest walls are favourite situations of herpes (**721**); the posterior, of acne (Pt. I, **40**).

Chloasma.

720. *Chloasma*, or *Pityriasis Versicolor*, is the term applied to a parasitic, contagious disease, the favourite situation of which is the skin of the front of the chest and abdomen.

It presents itself in the form of numerous, irregular patches, varying in colour from a yellow to a brownish tinge, and extending by a slightly raised and somewhat scaly margin.

The eruption, which in some cases is attended by troublesome itching and irritation, especially when the skin becomes hot, is usually met with after puberty, being very rare in children.

The patches consist of bran-like epithelial cells, which, if examined microscopically, will show the spores and branching filaments of the vegetable parasite, "Microsporon furfuraus."

Herpes Zoster.

721. *Herpes Zoster* or *Shingles*.—The chest walls are favourite situations of herpes, the general characteristics of which have been described (**489**); in many instances, the eruption of the vesicles, which follow the course of one or more of the intercostal nerves, will have been preceded by evidences of intercostal neuralgia (**731**). The eruption, which is almost invariably unilateral, affecting only one side of the chest, may manifest itself in two ways; in some cases, there is a continuous band of vesicles running from spine to sternum, involving one, two, or three intercostal spaces; in other cases, the vesicles may appear in three groups, one near the spine, corresponding with the distribution of the posterior twigs of the intercostal nerves; a second group midway between the spine and sternum, where their lateral branches become cutaneous; and a third group near the sternum, where the nerves terminate.

Ulceration.

722. *Ulceration* of the chest walls is often met with

in strumous (**500**) or syphilitic (**499**) subjects, presenting characteristics similar to those described.

When situated over the upper part of the sternum, it is very commonly of a syphilitic nature, being due to the breaking down either of a subcutaneous (**730**) or periosteal (**750**) gumma; under the latter circumstances, the ulceration is often accompanied by necrosis of the subjacent bone (**751**).

Sinuses.

723. *Sinuses.*—A fistulous opening, surrounded or covered over by projecting granulations, and discharging unhealthy pus, situated at any point of the chest walls is usually diagnostic of caries or necrosis (**742**) (**751**) of the subjacent bone, but independently of these conditions, it may be due to non-closure of the cavity of an abscess (**726**) occurring from other causes, or to perforation of an empyema (**724**).

Empyemic Fistula.

724. *Empyemic Fistula.*—In some cases, an Empyema (**780**), or collection of pus in the pleural cavity, may burst and discharge spontaneously. The usual situation for this occurrence is the fifth intercostal space in the infra-mammary line, this being the weakest and most unprotected part of the chest walls, for the pleura at this spot is only covered in by the internal intercostal muscle, the intercostal fascia, and the weakest portion of the pectoralis major and external oblique muscles.

This spot corresponds nearly with the middle of the pleural cavity when that is much distended.

"An empyema may be regarded as a great pleural abscess, and as we know abscesses often point opposite their centre."

In children, perforation often takes place higher up, even as high as the second interspace, this spot being

covered over by an interfascicular part of the pectoralis major which is exceptionally thin.*

Tumours.

725. The *Tumours or swellings* (excluding those of the mammary gland (**815**)) most commonly met with in connection with the soft tissues of the chest walls are as follows, abscess (**726**); lipoma (**404**); sebaceous cysts (Pt. I, **6**); nævi (**526**); hæmatoma (**729**); gummata (**730**); emphysema (**774**).

In distinguishing between a tumour or swelling originating in the soft tissues, and one connected with the deeper structures, attention to the following points will often be of service; in the former case, the swelling will be of a more superficial nature, being more or less freely moveable over the ribs or sternum, as the case may be; it will probably move with the skin or roll beneath it; there will also be an absence of the symptoms described as characteristic of a tumour of the ribs (**743**) or sternum (**749**); or of empyema pointing spontaneously (**724**); or of a mediastinal tumour (**782**); or of a pneumatocele (**781**).

Abscess.

726. *Abscess* forming in connection with the walls of the chest may be due to several causes.

1. It may form in the soft tissues of the chest walls, occurring either idiopathically or as the result of injury. Under these circumstances, an abscess may show itself at any point, appearing either as a superficial or deep-seated fluctuating swelling, preceded or accompanied by more or less evident signs of inflammatory action, viz. pain, heat, redness of the integuments, &c., according as the process which gives rise to it is of an acute or a chronic character. There will also in these cases be an absence of those symptoms, which are met with when an abscess forms in connec-

* Marshall, 'Lancet,' 1882, I, 337.

tion with disease of the subjacent bones, or when the pus comes from a distance (cf. below).

Cf. also subscapular (**388**) and subpectoral (**727**) abscess, which are special forms of this variety.

2. An abscess may appear at any point in connection with affections of the bones and periosteum, *e. g.* costal (**741**), sternal (**750**) abscess.

3. The pus may come from a distance, *e. g.*

Mediastinal abscess, where the pus usually points above, below, or to one side of the sternum (**784**).

Empyema, where, if spontaneous opening occurs, the pus usually points in the 5th space in the infra-mammary line (**724**).

Axillary abscess, where the pus may point on either the anterior or posterior wall of the thorax, at a distance from the axilla (**424**).

Subpectoral Abscess.

727. *Subpectoral Abscess.*—Suppuration may occur in the cellular tissue beneath the pectoral muscle, in some cases idiopathically, but perhaps more frequently as the result of some injury, *e. g.* a severe strain, or a contusion of the chest walls.

The symptoms in the early stage are often somewhat obscure, consisting simply of a diffused painful swelling in the pectoral region, with œdema of the overlying skin, and accompanied by more or less constitutional disturbance; owing to the distance at which the pus lies from the surface, fluctuation cannot in many cases be detected until the abscess tends to point, which may occur in the axilla, or above or below the margin of the pectoral muscle.

In many cases it is extremely difficult to distinguish between this condition and a hæmatoma (**729**) forming in the same situation, for both may follow an injury; the more rapid appearance of the swelling in the latter

case after the receipt of the injury; the fact that it is not preceded by evidences of inflammatory action; its softer, and in some cases its more distinctly fluctuating character, and the discoloration of the skin over it, will usually assist in diagnosis.

Supra-sternal Abscess.

728. An abscess is sometimes met with just above the upper border of the sternum, in the space between the sterno-mastoid muscles; appearing in this situation, it may be due to disease of the adjacent bones, or of the sterno-clavicular joint (**755**); or it may be a mediastinal abscess (**784**) pointing above the sternum.

In other cases, it is the result of inflammation of the lymphatic glands at the root of the neck (Pt. I, **247**), or of caries of the cervical vertebræ (Pt. I, **304**). Cf. also cervical abscess (Pt. I, **256**).

Hæmatoma.

729. A *Hæmatoma*, or blood-cyst (**425**) may form at any point of the chest walls as the result of injury, *e.g.* a blow, &c.; when occurring beneath the pectoral muscle, it is very liable to be mistaken for a subpectoral abscess (**727**).

Gummata.

730. *Gummata* (**406**) are often found on the chest walls, especially over the upper portion of the sternum; they may involve only the skin and subcutaneous tissue, or the periosteum and subjacent bone (**750**).

Intercostal Neuralgia.

731. *Intercostal Neuralgia.*—Neuralgia affecting the intercostal nerves, especially the 6th to the 9th on the left side of the chest, is often met with; it is characterised by pain in the side, in some cases intermittent and occurring in paroxysms, in other cases constantly present, but increased at intervals.

The pain, which is usually of a sharp or shooting character, is often referred to those points where branches of the intercostal nerves become cutaneous, and spots of tenderness, "points douloureux," are often found in the

same situations, viz. near the spine, at the side of the chest, and close to the sternum.

In many cases, this affection is accompanied or followed by an attack of herpes (**721**).

Diagnosis.—From pleurisy, intercostal neuralgia may be distinguished by the fact that the pain in the latter affection is often intermittent, occurring independently of the movements of respiration, also, by the absence of the characteristic pulmonary symptoms found in cases of pleurisy.

From pleurodynia (**732**), it may be distinguished by the fact that the pain in the former affection is generally increased on any movement of the part, and the characteristic "points douloureux" are not present.

Pleurodynia.

732. In *Pleurodynia*, or rheumatism attacking the muscles of the chest walls, pain of a dull aching character, worse at night, affected by the weather, and increased on any movement which brings the parts into action, is complained of.

From pleurisy, this affection may be distinguished by the absence of the pulmonary physical signs characteristic of that condition.

Rupture of Pectoral Muscle.

733. *Rupture of the Pectoralis Major* is sometimes met with as the result of severe wrenches or strains of the arm and shoulder. The symptoms of this injury are usually obvious, a distinct gap being found at the seat of rupture, owing to the retraction of the ends of the torn muscle; its function is more or less completely lost, and in many cases considerable extravasation of blood is also present.

Deficiency and Atrophy of Pectoralis Major.

734. Congenital deficiency of the pectoralis major is sometimes met with, and as the result of long-continued disuse, or of injury or disease affecting the nerves which supply it, considerable atrophy of its substance may result.

CHAPTER LXIII

AFFECTIONS OF WALLS OF THORAX (RIBS AND STERNUM)

Rigidity.

735. Undue *Rigidity* of the chest walls is often met with in old people, owing to ossification of the cartilages of the ribs; as a consequence, the movements of the chest are interfered with, and in some cases the breathing is seriously embarrassed, becoming almost entirely abdominal.

The same condition may also be produced in cases of rheumatic arthritis (**738**).

Softening.

736. *Softening* of the chest walls is often found in rickets (**709**), and also in the case of infants and young children who are weakly and ill-nourished; as a consequence, considerable deformity of the thorax may be produced, *e.g.* the alar (**706**), flat (**707**), pigeon (**708**), and rickety (**709**) chests.

A similar condition is also met with in cases of mollities ossium (**452**).

Hypertrophy.
Atrophy.
Mollities Ossium.
Ostitis deformans.

737. The chest walls, more especially the ribs, may become affected with *Hypertrophy* (**455**), *Atrophy* (**454**), *Mollities ossium* (**452**), *Ostitis deformans* (**453**), presenting in each instance symptoms similar to those described in the case of the humerus.

Atrophy of the ribs is not uncommonly met with in the insane; hence the frequency of fractures of the ribs in the inmates of asylums, as the result in many cases of a very slight degree of external violence.

738. In *Chronic Rheumatic Arthritis*, the costo-vertebral, the costo-chondral, and chondro-sternal joints may become the seat of changes similar to those described in the case of the shoulder-joint (**417**), more or less complete anchylosis, and as a consequence rigidity (**735**) of the chest walls being produced. Rheumatic Arthritis.

739. A tumour or swelling of the shaft of a rib may be due to various causes. Tumours or Swellings of Ribs.

Tumours or Swelling of Ribs.
- Inflammatory
  - Periostitis (including Costal Abscess) (741).
  - Excessive formation of Callus after Fracture (757).
  - Necrosis, where the sequestrum is surrounded by a sheath of new bone (742 .
- Rickety . "Beading" of the Ribs (740).
- New Growths
  - Sarcomata (744).
  - Enchondromata (745).
  - Exostosis (745).

740. "*Beaded Ribs*," or "*Beading of the Ribs*," is the term applied to the enlargement or nodular thickening of the ribs, which is often met with at their anterior extremities, at their point of junction with the cartilages, in cases of rickets (**451**). In many cases, it appears to be an enlargement of the costal ends of the cartilages rather than of the ribs themselves; the condition is analogous and due to the same cause (*i. e.* proliferation of the epiphysial cartilage) as the thickenings met with at the extremities of the other long bones in rickets, cf. humerus (**451**). "Beaded Ribs."

All the ribs on both sides of the chest may be affected in this way, but those especially liable are the fifth and sixth; in most cases, the thickenings are more marked on their pleural than on their subcutaneous surface.

From the supposed resemblance which the nodular swellings, lying one under the other, have to a row of beads, the terms "beading of the ribs" and "the rachitic rosary" have been applied to this condition.

Associated with it, we often find the peculiar deformity of the chest described (**709**) "the rickety chest," the nodular swellings lying at the bottom or to one side of the groove which is formed where the ribs and their cartilages unite.

Beading of the ribs is usually one of the early manifestations of rickets, being sometimes present as early as the sixth week after birth.

Costal Periostitis.

741. *Periostitis of the Ribs* may occur as an acute or a chronic affection; it may be produced as the result of injury; or appear in connection with empyema (**780**); or come on as an idiopathic affection, *e. g.* in cases of struma, or in a low state of health from any cause, or as a sequel of one of the fevers, especially typhoid; or it may be due to syphilis, the ribs becoming the seat of nodes like the other long bones of the body.

Costal periostitis usually manifests itself as a well-defined, round or oval swelling, situated in the course of, and connected with, a rib, the direction of which it follows: the swelling, which is at first firm and hard, is tender to the touch, and painful, especially at night.

If suppuration ensues, "*Costal Abscess*," the swelling becomes soft, elastic, and fluctuating; if left to itself, the pus slowly discharges through one or more openings in the skin, and sinuses form, which lead down to dead bone (**742**), and are always very slow in closing.

Any of the ribs may become affected in this way at any part of their course, but when due to simple causes and independently of injury, the ribs at the front and lower part of the chest are more commonly involved than those at the back, sides, or upper parts.

Syphilitic periostitis, on the other hand, though it may attack any of the ribs, is much more frequently met with at the upper part of the sternum (**750**).

Diagnosis of Costal Abscess. From an *abscess or tumour of the soft tissues* (**725**), a costal abscess may be distinguished by the fact that it will usually have been preceded by evidences of periostitis; the swelling, which is generally oval in shape, follows the course of a rib, along which it tends to spread, and with which it is connected, moving with it during respiration and not rolling with or moving beneath the skin.

From a *localised Empyema*, or one which is on the point of bursting (**780**), it may be distinguished by attention to the following points: a costal abscess is not appreciably influenced by the ordinary movements of respiration, *i. e.* there is no increase in size on taking a deep breath, and no impulse on coughing, though the swelling may then become more tense, owing to compression by the thoracic muscles and fascia; there is, moreover, no fulness of the side of the chest, no bulging of the intercostal spaces, no dulness on percussion, no deficient movement of the chest walls, no absence of the breath sounds—symptoms all present to a greater or less degree in empyema.

Caries and Necrosis of Ribs.

742. *Caries* (**449**) and *Necrosis* (**448**) of the ribs are generally the result of costal periostitis (**741**): they may be superficial, affecting the external surface of the bone, or deep, attacking its inner or pleural surface: the general symptoms will be the same as those described in the case of the humerus, sinuses being present and leading down to bare bone, which, if superficial, can be readily felt with a probe, while if the inner or pleural surface of the rib is affected, and especially if it is surrounded by a sheath of new bone, it will often be impossible to detect its presence.

Under the latter circumstances the dead bone cannot make its way externally, and as it is in many cases

difficult to remove it by operation, necrosis of the ribs is consequently an extremely troublesome affection, the sinuses often remaining open, and continuing to discharge pus for months, and even years.

If, however, the dead bone comes away of itself, or is removed, the sinuses readily close, leaving behind them deeply-depressed scars.

Tumours of Ribs.

743. *Tumours* of the ribs are not of very common occurrence, though sarcomata, enchondromata, and exostoses are occasionally met with.

Sarcomata.

744. *Sarcomata*, springing either from the interior of the shaft of a rib, or from the periosteum covering it, are sometimes seen; in their general course and symptoms they resemble similar tumours of the humerus (**461**).

Enchondromata. Exostoses.

745. *Enchondromata* (**571**) and *Exostoses* (**460**) are of rare occurrence.

Malformation of Ribs.

746. In very rare instances a portion of one or more ribs may be absent at birth. Under these circumstances a protrusion of the lung, pneumatocele (**781**), will probably be present.

Supernumerary Ribs.

747. In very rare instances there may be more than the normal number of ribs present on one or both sides of the body. The supernumerary ribs may be situated either in the cervical or lumbar region.

Prominence of Sternum.

748. *Undue Prominence of the Sternum* may be due to the following causes:

1. Deformity of the thorax, accompanied by projection forwards of the sternum, *e.g.* pigeon chest (**708**); rickety chest (**709**); in emphysema (**710**).

2. Mediastinal tumours, pushing the sternum forwards (**782**).

Enlargement of Sternum.

749. *Swelling or enlargement of the Sternum* may be due to the following causes:

1. Periostitis of sternum, usually syphilitic (**750**).
2. Tumours of sternum (usually sarcomata) (**752**).

Sternal Periostitis.

750. *Periostitis of the Sternum* may be due to injury or to other causes, as in the case of the same affection attacking the ribs (**741**); in the majority of cases, however, and especially when it involves the upper part of the bone or the contiguous portions of the clavicle and 1st rib, it is of syphilitic origin. Under these circumstances it is usually a late or tertiary symptom, commencing as a periosteal gumma, which shows itself as a firm swelling, unattended by much or any pain, except at night, varying in size, in some cases circumscribed, in others diffused and involving the whole of the upper portion of the sternum and adjacent bones.

In many instances the gumma softens and breaks down, and, suppuration ensuing, an abscess is formed, "*sternal abscess.*"

Under these circumstances the superjacent integuments ulcerate and give way, and a large, deep, circular ulcer (not a mere sinus) appears, at the bottom of which bare bone can usually be seen or felt with a probe.

In many cases the ulcer tends to spread with circular or crescentic outline, presenting the characteristics met with in syphilitic ulceration (**499**). If repair takes place and the sore heals, the cicatrix is usually typical, being of considerable size, and deeply depressed below the level of the surrounding skin, much more so than is generally the case when the same condition is due to simple causes.

Diagnosis of Sternal Abscess.—From *abscess or tumour of the soft tissues* over the sternum, this affection can usually be distinguished by the fact that the swelling,

which will have been preceded by evidences of periostitis, is fixed and connected with the sternum, not rolling with or moving beneath the skin.

From *Mediastinal Abscess* (**784**) it can be distinguished by attention to the following points:—In sternal abscess external evidences of inflammatory action are present in the early stage, there being more or less local increase of temperature, pain, tenderness on pressure, and redness of the skin over the front of the swelling. In mediastinal abscess these symptoms are altogether absent at first, not appearing until the pus is making its way to the surface.

In *Sternal Abscess* the swelling is at first limited by the periosteum to the front of the sternum, not appearing at its side or above or below it, as would be the case in a mediastinal abscess. The swelling does not expand or yield an impulse when the patient coughs, nor pulsate as some cases of that affection do; then, again, there is an entire absence of the intra-thoracic pressure symptoms which usually accompany mediastinal abscess (**784**).

Caries and Necrosis of Sternum.

751. *Caries* and *Necrosis* of the sternum are generally the result of periostitis (**750**), and in the majority of cases are of syphilitic origin. As in the case of the other flat bones, *e.g.* scapula (**393**) the sequestrum or dead portion of bone is often long in separating.

In some cases complete perforation of the sternum is produced. Under these circumstances, in cases of mediastinal abscess, pus may make its way through the opening from the interior of the thorax, while in cases of superficial abscess it may pass in the opposite direction.

Tumours of Sternum.

752. *Tumours of the Sternum* are not of very frequent occurrence, though, as in the case of the ribs, it may

become the seat of sarcomatous, osseous, or cartilaginous growths.

Sarcomata.

Sarcomata are perhaps most commonly met with, springing either from the periosteum or interior of the bone, and presenting characters similar to those described in the case of the humerus (**461**).

In the early stage a sarcomatous tumour will present itself as a more or less diffused swelling of the front of the sternum, so that in many cases it is at first extremely difficult to distinguish between this affection and a simple inflammatory thickening of the bone, *e.g.* from periostitis (**750**).

Diagnosis.—From *simple or traumatic periostitis* it may be distinguished by attention to the following points: In sarcoma there will frequently, especially in the early stage, be an absence of much or any pain, of tenderness upon pressure, of local increase of temperature, and of redness of the skin; the swelling will more or less rapidly increase in size, in spite of treatment; the swelling usually appears without any exciting or predisposing causes, *e.g.* a local injury, struma, ill-health, &c.

From *Syphilitic Periostitis* it may be distinguished by the same general symptoms, by the absence of any tendency to soften and break down, by the fact that specific treatment has no effect, and by the absence of other evidences or a history of other symptoms of syphilis.

From *Mediastinal Tumours* (**782**) it may in the early stage be distinguished by the absence of any pressure effects on the thoracic organs, for these symptoms will not be present until the tumour is of considerable size; also by the fact that the enlargement of the sternum is an early symptom, while in the case of mediastinal tumours

it for a long time preserves its normal appearance, not becoming pushed forwards until late in the course of the disease, when the intra-thoracic growth has attained large dimensions; from the commonest variety of mediastinal tumour, *i. e.* aneurism (**783**), it can be readily distinguished by the absence of pulsation.

Course.—As the tumour increases in size, it may grow either internally or externally, or in both directions, and at the same time tend to spread laterally, involving the adjacent portions of the ribs; when growing into the interior of the thorax, all the symptoms met with in cases of mediastinal tumour (**782**) may be produced, but, as at the same time the growth generally tends to project rather in front, there is usually little difficulty in diagnosis, for the external swelling is in most cases much greater than would be found in cases of intra-thoracic growths, or in simple inflammatory thickenings or enlargements of the sternum from any cause.

Shoemaker's Sternum.

753. *Shoemaker's Sternum* is the term applied to the depression produced at the lower part of the sternum, as the result of the pressure of the wooden instrument which they keep fixed against this part of the chest wall while at work.

Malformations of Sternum.

754. Various forms of *malformation* of the sternum are occasionally met with at birth; in some cases it is completely absent; or the manubrium only may be present; or it may be cleft, *i. e.* divided into two parts by a vertical fissure; under these circumstances "ectopia cordis," *i. e.* protrusion of the heart and pericardium, sometimes occurs through the opening in the thoracic wall.

Disease of the Sterno-clavicular Joint.

755. *Disease of the Sterno-Clavicular Joint* is not of very common occurrence.

In *Rheumatic Arthritis* (**417**), the sternal extremity of the clavicle occasionally becomes enlarged from deposit of osteophytes, so that the joint is rendered stiff and painful, and as a consequence, the movements of the upper extremity are interfered with.

Acute Inflammation of the Joint is also met with, perhaps most commonly in the course of cases of pyæmia, in which affection it is said to be the joint most frequently involved, or it may result from injury, or occur in cases of syphilis, *e. g.* in periostitis involving the inner end of the clavicle (**374**), (**375**), or upper portion of the sternum (**750**), or in cases of gummatous deposits (**730**) situated near the joint.

Owing to the superficial position of the joint, the symptoms present in these cases are usually well-marked; it becomes swollen, and painful, the integuments over it are hot and reddened, and if pus forms in its interior or around it, fluctuation will be evident; in some cases, an abscess forming under these circumstances, especially if it extends behind the joint, may have pulsation communicated to it from the subclavian or innominate artery, and thus simulate an aneurism.

If the abscess is opened or discharges externally, a sinus will be left leading down to the interior of the joint, and in some cases dislocation of the clavicle results. In many instances, caries or necrosis of the articular portions of the clavicle and sternum ensues, but if the dead portion of bone comes away or is removed, recovery often takes place with a fairly useful joint, complete bony anchylosis being rarely met with, owing to the fact that it is impossible to keep the joint in a state of perfect rest; the presence of the inter-articular fibro-cartilage may also tend to prevent the same result.

Disease of the Inter-sternal Joint.

756. *Disease of the Inter-sternal Joint.*—In rare instances, disease of the articulation between the first and second bones of the sternum (which contains no synovial membrane), is met with; the symptoms of this condition are swelling and tenderness over the joint with constant pain increased on pressure or upon any sudden movement, *e. g.* a cough, &c.; in many cases considerable difficulty of breathing is also present, the patient being unable to take a full inspiration.

CHAPTER LXIV

FRACTURES AND DISLOCATIONS OF THE RIBS AND STERNUM

757. *Fracture of the Ribs* is an accident of frequent occurrence, especially in adults and elderly persons when the bones have become rigid and brittle; in children and young subjects, the injury is less commonly met with, owing to the greater elasticity of the ribs at an early period of life. It may be produced in various ways, *e. g.*: Fracture of Ribs.

1. From direct violence, *e. g.* a blow or fall on some projecting body: under these circumstances, the rib gives way at the seat of injury, and the broken fragments are driven inwards.

2. From indirect violence, *e. g.* a crush or squeeze, where the chest is forcibly compressed: under these circumstances the ribs usually give way about the middle, and the broken ends are driven outwards.

3. From muscular action, *e. g.* violent attacks of coughing; fracture from this cause is a rare occurrence, and in most cases the ribs will have been previously weakened from disease.

The ribs most commonly fractured are the middle ones, especially the 4th, 5th, 6th, 7th, the first three being somewhat protected by the clavicle and lying at a greater depth from the surface, the last five being more mobile and less firmly fixed than the others.

The fracture may be *complete* or *incomplete*, *i. e.* the periosteum may remain untorn; it may be *single*, *i. e.* only one rib may be involved, or it may be *multiple*, several ribs on one or both sides of the body being broken.

The fracture is said to be *simple* when there is no external wound, and it is not accompanied by any other injury; *compound* when an external wound is present, leading down to the fractured ends of the bone; *complicated* when it is accompanied by injury to the contents of the chest or abdomen.

Symptoms of Simple Fracture.—Pain is felt at the seat of injury, increased on coughing, or taking a deep breath, and as a consequence respiration is shallow and the breathing is embarrassed. In some cases, a short hacking cough is present, probably the result of injury to or irritation of the intercostal nerves by the broken ends of the bone: (in complicated fracture, when the lung or pleura are injured, this symptom is the result of direct irritation of these structures).

Crepitus can usually be detected on laying the hand upon or applying the ear to the seat of fracture, especially if the patient at the same time coughs or takes a deep breath; or upon making pressure alternately with one finger of each hand on either side of the seat of fracture: in some cases, the patient will be sensible of a grating or crepitant feeling at every breath; in incomplete fracture, crepitus will not be present, and it often escapes detection in cases where a single rib is broken, especially if the seat of fracture is covered over by a thick layer of muscle or fat.

There is not, as a rule, any perceptible deformity or displacement of the fragments, though if several ribs

are broken, their contour can often be felt to be irregular, and there may be some depression or projection of the fractured ends.

Mode of Union.—Owing to the impossibility of keeping the parts in a state of complete rest, union is always effected by means of provisional callus, and in many cases this is considerable in amount, so that the shaft of the bone at the seat of fracture presents for a time a nodular swelling or enlargement: this, however, is only temporary, for as union is effected, the callus gradually becomes absorbed and the swelling disappears.

Complicated Fractures comprise the following injuries, which are most liable to be produced when, as the result of direct violence, the broken ends of the ribs are driven forcibly inwards.

1. Injury to the costal pleura: under these circumstances, pleurisy (**779**), empyema (**780**), hæmothorax (**777**), may ensue.

2. Injury to the lung: under these circumstances, emphysema (**774**), pneumothorax (**775**), pneumonia (**778**), pneumatocele (**781**), or any of the above complications may ensue.

3. Injury to the heart or pericardium (**769**).

4. Injury to the diaphragm or abdominal viscera (**785**).

Fracture of Sternum.

758. *Fracture of the Sternum* alone is extremely uncommon, but as a complication of other injuries, *e. g.* fracture of the ribs or vertebræ, it is sometimes met with; it is generally the result of severe direct violence, but it may also be produced from indirect force, *e. g.* forcible bending of the body backwards or forwards: under these circumstances it is often associated with fracture of the spine; in rare instances,

fracture has resulted from muscular action, *e. g.* violent straining during parturition.

The line of fracture is usually transverse, and often near the point of union of the manubrium with the 2nd piece of the sternum.

The symptoms are very similar to those accompanying fracture of a rib (**757**); there is pain at the seat of injury, increased on taking a deep breath or upon making pressure on the part; more or less dyspnœa is usually complained of; abnormal mobility is generally present, and crepitus can be often detected on placing the hand upon the seat of fracture; in some cases, displacement of the fragments, usually of the upper one behind the lower, is also present.

Fracture of Costal Cartilages.

759. *Fracture of the Costal Cartilages* is a very rare accident: the 8th cartilage is the one most frequently involved, and it may give way either at its middle or close to its junction with the rib.

This injury may occur as the result of either direct or indirect violence; and the general symptoms are very similar to those accompanying fracture of a rib (**757**), though in many cases more deformity is produced, one fragment often considerably overlapping the other.

Dislocations of Ribs and their Cartilages.

760. *Dislocations of the Ribs and their Cartilages* are of rare occurrence, and when present are usually associated with some other injury, *e. g.* fracture or dislocation of the spine or sternum, &c.: several varieties are met with, *e. g.*:

1. *Costo-vertebral:* where the head of the rib is displaced from its connection with the vertebræ.

2. *Costo-chondral:* where the rib is displaced from the costal cartilage.

3. *Chondro-sternal:* where the costal cartilage is displaced from the sternum.

4. Dislocation of the costal cartilages from one another may also occur.

761. *Dislocation of the bones of the Sternum* from one another, usually of the first from the second, is rarely met with: the causes and symptoms of this injury are identical with those of fracture (**758**). Dislocation of Bones of Sternum.

CHAPTER LXV

INJURIES OF THE CHEST AND THEIR COMPLICATIONS

Injuries of Chest.

762. *Injuries of the Chest* may be divided into two classes:

I. *Injuries and Wounds involving only the parietes of the Chest*, including—

1. Contusions of the chest walls (**763**).
2. Non-penetrating wounds of the chest walls, *i. e.* wounds not penetrating the costal pleura (**764**).
3. Fractures and dislocations of the ribs and sternum (**757—761**).

II. *Injuries and Wounds involving the contents of the Chest*, including—

1. Penetrating wounds, and injuries of the parietes without external wound, either of which may be accompanied by injury to the pleura (**766**), lung (**767**), thoracic vessels (**771**), heart and pericardium (**769**), œsophagus (**772**), or diaphragm and abdominal viscera (**785**).
2. Rupture of the thoracic viscera or diaphragm, without external wound or injury of the parietes, including rupture of lung (**768**), of heart (**770**), or of diaphragm (**785**).

Contusions.

763. *Contusions* of the chest walls differ in no respect from similar injuries in other parts of the body; if accompanied by rupture of one of the superficial thoracic vessels, a hæmatoma (**729**) may form; or the injury, if involving the front of the chest, may be

followed by the formation of a subpectoral abscess (**727**); in many cases, a contusion or crush of the chest walls is complicated with fracture of one or more ribs (**757**).

Non-penetrating Wounds.

764. *Non-penetrating Wounds, i. e.* wounds not penetrating the costal pleura, are not as a rule attended by any special symptoms; it is always important to distinguish them from penetrating wounds (**765**) of the same parts, and in many cases this is extremely difficult, especially when the external wound is of small size, *e. g.* in a stab or punctured wound, or when the injury is accompanied by emphysema, for this complication may occur without any implication of the lung or pleura (**774**); under these circumstances, we have mainly to rely upon negative evidence, viz. the absence of the symptoms characteristic of a penetrating wound (**765**).

Penetrating Wounds.

765. *Penetrating Wounds, i. e.* wounds involving the costal pleura (**766**), the lung itself (**767**), or the other contents of the thorax, are always of serious importance, not only on account of the immediate consequences which may ensue, *e. g.* hæmoptysis (**776**), hæmothorax (**777**), emphysema (**774**), pneumothorax (**775**), collapse of the lung (**777** *a*), pneumatocele (**781**), &c., but also on account of the secondary complications, the result of inflammation, which may afterwards manifest themselves, *e. g.* pneumonia (**778**), pleurisy (**779**), empyema (**780**), &c.

The symptoms characteristic of a penetrating wound will vary in different cases, depending upon the particular organ or structure which is involved; cf. wounds of pleura (**766**), lung (**767**), thoracic vessels (**771**), heart and pericardium (**769**), &c.

In no case should any attempt be made by probing

the wound to estimate its depth, for by doing so a non-penetrating wound might be easily converted into a penetrating one, and in this way very considerable damage would be inflicted; in diagnosing the nature of the injury, deductions must be drawn simply from the symptoms which are present.

Wounds of Pleura.

766. *Wounds of the Pleura* alone (*i. e.* involving the costal pleura only, without injuring the pulmonary pleura or lung), as the result of penetrating wounds, are of rare occurrence.

If the external wound is large, the nature of the injury is usually obvious, but when it is of small size, *e. g.* in the case of a stab or puncture, the diagnosis is often extremely difficult, for the injury may be accompanied by many of the symptoms which accompany a wound of the lung (**767**), *e. g.* emphysema, hæmothorax, &c.

Wounds of Lung.

767. *Wounds of the Lung* may be produced in several ways, *e. g.* as the result of penetrating wounds of the chest walls, from stabs, gunshot injuries, &c.; or in cases of fractured ribs, where the broken ends, being driven inwards, lacerate the pleura and penetrate the substance of the lung itself (**757**): in rare instances, rupture of the lung (**768**) may occur without any injury to the walls of the chest.

The *symptoms* of this injury are usually well-marked; in addition to the general shock which immediately follows the accident, there will be more or less dyspnœa, pain in the chest, and constant cough with a sensation of irritation and tickling about the larynx, the expectoration consisting of blood mixed with air and mucus, "hæmoptysis" (**776**); in serious cases, where a large vessel has been injured, considerable quantities of almost pure blood may be coughed up

and under these circumstances symptoms of syncope will also be present.

If an external wound is present, there may be a passage of air mixed with blood in and out of it at each act of respiration, "*traumatopnœa*," and if any vessel of considerable size is injured, the external bleeding may be free and copious.

Complications. — The *primary* complications of a wound of the lung are as follows:

1. *Hæmorrhage*, either internally, *i. e.* into the pleural sac, constituting "Hæmothorax" (**777**); or externally, as described above, viz. either from the mouth, "Hæmoptysis" (**776**), or from the external wound when one is present.

2. *Escape of Air*, into the subcutaneous tissue of the chest walls, "Emphysema" (**774**); or into the cavity of the pleura, "Pneumothorax (**775**); or in and out of the external wound, when one is present, "Traumatopnœa."

3. *Collapse of the Lung* (**777** *a*), sometimes produced in cases where there is an external wound.

The *Secondary* complications coming on at a later period, usually as the result of inflammatory action, are as follows, pneumonia (**778**), pleurisy (**779**), empyema; (**780**), collapse of the lung (**777** *a*) may also occur.

In cases where an external wound is present, a protrusion of the substance of the lung, pneumatocele (**781**), may occur, either immediately after the injury or after some interval.

768. *Rupture of the Lung* without injury to the chest walls is rarely met with; it may, however, occur in cases where, when the lung is distended with air and the glottis is closed, the thorax is suddenly and forcibly compressed. Rupture of Lung.

If the pleura is lacerated at the same time, the general symptoms will be much the same as those met with in cases of wounds of the lung (**767**).

Wounds of Heart.

769. *Wounds of the Heart* and pericardium may be produced in the same way as wounds of the lung (**767**).

The symptoms of this injury, if not immediately fatal, are as follows :—External hæmorrhage will probably be present if there is a wound, along with dyspnœa, syncope, and irregularity and smallness of the pulse. The action of the heart is laboured and tremulous, being accompanied by a peculiar bruit, and a kind of undulous crepitation is often observed, owing to the presence of the blood poured out round it in the sac of the pericardium; for the same reason the heart sounds are weakened, and the area of cardiac dulness is increased.

In most cases wounds of the heart are rapidly fatal, either from shock or from loss of blood.

In rare instances the pericardium only may be wounded. Under these circumstances the general symptoms will be much the same, though of a less severe type.

Rupture of Heart.

770. *Rupture of the Heart*, without any injury to the chest walls beyond a severe crush, is an extremely rare injury, and one which in the majority of cases is followed by almost instantaneous death.

Wounds of Thoracic Vessels.

771. *Wounds of the Thoracic Vessels.*—Wounds of the intercostal arteries may occur in cases of penetrating wounds, in fractures of the ribs, in operations on the chest, *e.g.* paracentesis, excision of a portion of a rib, &c.; they often complicate wounds of the lung (**767**).

The result of this injury will be hæmorrhage into the cavity of the pleura, hæmothorax (**777**), with, in many cases, external bleeding from the wound, when one is

present; when complicated with wound of the lung, symptoms of that injury will also be observed (767).

Wounds of the internal mammary arteries are also met with, though not so frequently, owing to the more protected situation of these vessels.

Wounds of the larger vessels of the chest, *e.g.* aorta, innominate or pulmonary arteries, &c., are, as a rule, rapidly fatal from profuse internal hæmorrhage.

Wounds of Œsophagus.

772. *Wounds of the Œsophagus.*—In rare instances wounds of the thoracic portion of the œsophagus may occur as the result of penetrating wounds of the chest.

Complications of Injuries of the Chest.

773. The following *complications* may accompany or follow an injury of the walls of the chest or its contents:

1. *Primary.*—Hæmoptysis (776); hæmothorax (777); emphysema (774); pneumothorax (775); pneumo-hæmothorax (777); collapse of lung (777*a*); pneumatocele (781).

3. *Secondary.*—Pneumonia (778); pleurisy (779); empyema (780); pneumatocele (781); collapse of the lung (777*a*).

Emphysema.

774. *Emphysema* is the term applied to the infiltration of air into the subcutaneous connective tissue, so often met with in cases of injury to the walls of the chest or lung. It manifests itself as a soft, compressible swelling, which communicates to the finger pressed upon it a peculiar crackling or crepitant sensation. The swelling, which presents a puffy appearance, and is covered by unchanged or unusually pale skin, may remain localised in the neighbourhood of the injury, or, gradually spreading, it may become general, involving the head, neck, trunk, and, in rare cases, the extremities,

so that the body generally presents a characteristic and peculiar blown-out appearance.

When present to a moderate extent, emphysema does not of itself give rise to any serious consequences, the effused air gradually becoming absorbed and the swelling disappearing; if, however, complicated by pneumothorax (**775**), serious impediment to respiration may be produced.

Emphysema may be produced in several different ways:

1. In cases of simple fracture of the ribs (**757**) where the lung is penetrated by one of the broken fragments; under these circumstances air passes out of the lung during inspiration into the pleural cavity; during expiration, air is forced out of the pleural cavity through the wound in the costal pleura into the subcutaneous tissue of the chest walls round about the seat of fracture; at each act of respiration this process is repeated, and the air gradually passing onwards may infiltrate first the chest walls and then the subcutaneous tissue of the body generally.

2. In cases of penetrating wounds involving the lung (**765**); here the process is almost the same, for during inspiration air enters the pleural cavity both from the lung and through the external wound; during expiration, the air passes out of the pleural cavity, partly through the external wound, "*traumatopnœa*," partly into the cellular tissue round about it; under these circumstances, emphysema is more liable to ensue if the external wound is small or oblique, for if large and direct, the air may all pass out through it during expiration, without making its way into the surrounding connective tissue.

3. In cases of penetrating wounds involving only the

costal pleura without injuring the lung (**766**); under these circumstances, air enters the pleural cavity through the external wound during inspiration; during expiration, it is partly forced out through the external wound, "*traumatopnœa*," and partly passes into the cellular tissue round about it.

4. In cases of rupture of the lung without external wound or fracture of the ribs; in rupture of the lung from injury (**768**), or from disease, *e.g.* bursting of a vomica, or in cases of idiopathic emphysema, if the pulmonary pleura is not injured, the air passing out of the rent in the lung into the posterior mediastinum may make its way into the cellular tissue of the neck, and thence onwards into that of the head, upper part of the thorax, and trunk generally.

775. *Pneumothorax*, or accumulation of air in the pleural cavity, sometimes accompanies emphysema (**774**), being due to the same causes, and being produced in the same way. Pneumothorax.

The symptoms of this condition are as follows: more or less urgent dyspnœa; tympanitic resonance on percussion; enlargement of the side of the chest, with deficient movement of the chest walls during respiration; flattening or bulging of the intercostal spaces, which at the same time are somewhat widened; amphoric respiration, &c.

776. *Hæmoptysis*, or expectoration of blood, is usually present, and therefore is a valuable diagnostic symptom in cases of injury to the lung; in slight cases, there may simply be expectoration of frothy, bloody mucus, but if any large vessel is wounded, considerable quantities of almost pure blood will be coughed up. Hæmoptysis.

777. *Hæmothorax*, or accumulation of blood in the Hæmothorax.

pleural cavity, is often met with in cases of wound of an intercostal artery or of the lung itself.

If at all considerable in amount, the general symptoms will be those of dyspnœa, with inability to lie on the sound side, and syncope from loss of blood, *e. g.* coldness and pallor of the surface of the body, small weak pulse, faintness, &c. with a tendency to collapse.

The physical signs will be those of fluid in the pleural cavity, *i. e.* dulness on percussion with absence of the respiratory murmur; ecchymosis of the skin over the posterior aspect of the lower part of the chest; bulging of the intercostal spaces; increase in the diameter of the chest on the affected side; if air is also present in the pleura, "*Pneumo-hæmothorax*," metallic tinkling or a splashing sound can often be obtained on succussion.

Collapse of Lung.

777 *a. Collapse of the Lung* may follow an open wound of the chest involving either the pleural cavity or lung itself.

It is, however, a condition which is much more frequently absent than present, unless from compression, as a complication of pneumothorax, hæmothorax, pleurisy, or empyema.

When present, collapse of the lung, if at all extensive, is accompanied by symptoms of severe dyspnœa with more or less retraction of the affected side of the chest; if, however, as is generally the case, it is the result of one of the above complications, the physical signs due to simple collapse will be more or less masked by those dependent on the condition to which it is secondary.

Pneumonia.

778. *Pneumonia.*—In all cases of injury of the lung, a certain amount of inflammation of its substance must necessarily accompany repair. The general symptoms of this condition are identical with those met with in

the idiopathic form, *e. g.* there is pyrexia, dyspnœa, rapid breathing, hacking cough with rusty-coloured expectoration, pain in the side, impaired expansion of the chest walls, dulness on percussion, increased vocal resonance and fremitus, crepitation, and absence of respiratory murmur, or tubular breathing, as hepatisation takes place.

Traumatic pneumonia differs from the idiopathic form in the fact that the inflammation is often more localised, remaining in many cases confined to the immediate neighbourhood of the injured portion of the lung.

779. In all cases where the pleura is wounded, whether from a penetrating wound or a fractured rib, a certain amount of inflammation must necessarily accompany repair. In ordinary cases, this only leads to an effusion of lymph by which the wound is closed, and to the formation of adhesions between the costal and parietal pleura. Pleurisy.

If, however, the inflammation is severe, an effusion of serum, more or less turbid and mixed with flakes of lymph, takes place into the interior of the pleural sac.

The symptoms of this condition are as follows, *e. g.* there is dulness on percussion; enlargement of the affected side of the chest with flattening or bulging of the intercostal spaces; faintness or absence of respiratory murmur, of vocal resonance, and of vocal fremitus; breath-sounds exaggerated above; œgophony; diminished movement of the affected side of chest; displacement of organs, *e. g.* heart, liver, &c.; the patient lies on the affected side, and there is dyspnœa, rapid breathing, with more or less pyrexia.

In favorable cases, the fluid may become absorbed,

or it may become purulent, constituting empyema (780).

Empyema.

780. *Empyema* is the term applied to an accumulation of pus in the pleural cavity, occurring in cases of pleurisy (779), when the serous effusion, instead of becoming absorbed, remains and becomes purulent.

It may follow any injury of the chest, which involves the pleura, but it is much more frequently met with as an idiopathic affection. The general symptoms are those characteristic of the presence of fluid in the pleural cavity (779), but when suppuration ensues, there is often, in addition, higher fever, especially towards evening, with rigors and night sweats, and after a time well marked evidences of hectic are often present.

If left to itself, an empyema may burst externally (724), or perforate the lung, causing sudden and profuse expectoration of pus, or travel downwards.

In some cases, an empyema is localised or encysted, being limited by the formation of adhesions to the immediate neighbourhood of the wound in the lung or pleura, when one is present; when due to idiopathic causes, an encysted empyema is most frequently met with in the middle third of the pleural cavity, being bounded on all sides by adhesions between the opposed pleural surfaces; when forming on the left side of the chest, an encysted empyema may, in rare instances, have pulsation communicated to it from the heart, so that the condition produced might simulate an aneurism, but the presence of fluctuation, and the absence of a distinct bruit and the other distinctive symptoms of aneurism, will usually assist in distinguishing between the two affections.

Pneumatocele.

781. *Pneumatocele*, or "*Hernia of the Lung*," is the

term applied to a rare condition in which there is a protrusion of the substance of the lung through an opening in the chest walls.

Two forms of the affection are described, primary and consecutive, according as the hernia immediately follows the injury or appears after some interval.

Primary pneumatocele is usually met with in cases of wounds of the chest walls, which expose the surface of the lung; under these circumstances, a protrusion of a portion of its substance may take place, presenting itself as an elastic, globular tumour, of a dark colour, with smooth shining surface, more or less completely reducible, increasing in size and presenting an impulse during a deep inspiration or on coughing, and communicating to the finger placed upon it, a characteristic, crepitant sensation.

In other instances, a primary pneumatocele may appear beneath the skin, in cases where there has been no external wound, but simply an extensive comminuted fracture of the ribs; under these circumstances, the general symptoms will be the same, differing, however, in the fact that the surface of the lung is not exposed, being covered over by the integument.

Consecutive pneumatocele is the term applied to the tumour when it appears some time after the receipt of the injury, *e. g.* in cases of external wounds, after repair has taken place; under these circumstances, the surface of the lung will be covered over either by skin or cicatricial tissue.

In rare instances, *e. g.* in congenital absence of a rib (**746**) or portion of the sternum (**754**), a pneumatocele may be present at birth.

CHAPTER LXVI

MEDIASTINAL TUMOURS

Solid and cystic Tumours.

782. Various forms of *Solid* or *Cystic Tumours* are met with in the interior of the thorax, *e. g.* carcinoma, sarcoma, lympho-sarcoma, enchondroma, &c., commencing either in the mediastinal glands, or in the lung or pleura. The symptoms and course of the disease vary considerably in different cases; as a general rule, a solid or cystic intrathoracic tumour tends to grow inwards rather than outwards, and it is somewhat exceptional to find erosion and destruction of the chest walls produced, as is often the case in aneurism (**783**), unless the growth is of large size, when external swelling will often be evident, as the result of outward pressure of the walls of the thorax.

When springing from the anterior mediastinum, there will often be a bulging forwards of the sternum and adjacent portion of the ribs on one or both sides; or, the bulging may mainly affect the lateral aspect of the chest, or present itself above the sternum or clavicle; in other cases, just the reverse condition may be produced, *i. e.* sinking in of the chest walls from collapse of the lungs, owing to pressure upon the bronchi.

Other symptoms which may be present are as follows, depending of course upon the size of the tumour and its situation; *e. g.* dulness on percussion; impaired movement of the chest walls; displacement of various

organs, heart, lungs, liver, &c.; derangement of the circulation from pressure on the large vessels or heart itself; changes in the lungs, emphysema, collapse, altered breath sounds, &c.; dyspnœa, from pressure upon the trachea, bronchi, or lungs; pleuritic effusions; affections of the larynx, hoarseness, loss of voice, cough, spasm, &c.; dysphagia, from pressure upon the œsophagus; a varicose condition of the veins, or œdema of the chest walls or upper extremity, &c.

For the diagnosis from aneurism, cf. (783).

Thoracic Aneurism.

783. *Thoracic Aneurisms* are, in the large majority of cases, connected with the aorta, which is frequently involved in the ascending portion of the arch.

The general symptoms of thoracic aneurism are as follows, varying, however, very considerably in different cases:

1. Local bulging, depending upon the situation of the tumour; if the ascending or transverse portion of the arch is involved, the prominence will be in front, above or behind, or to the right or left of the upper part of the sternum; if the remaining portion of the arch or descending aorta is implicated, the swelling may appear behind to the left of the spine; in either case, the bones, viz. sternum, ribs, or vertebræ may become more or less eroded and destroyed. 2. Pulsation of an expansile character over the swelling. 3. Dulness on percussion over the tumour. 4. A bruit to be detected upon auscultation. 5. The heart is often hypertrophied and displaced, either downwards, or to the left, or forwards. 6. The radial pulse is frequently affected, being often delayed on one side, or differing in force and fulness on the two sides. 7. Various other symptoms are often present, very similar to those met with in solid tumours (782), *e. g.* dysphagia; functional

disorders of the larynx; displacement of the lungs and interference with the entrance of air into their interior, &c.

Diagnosis.—It is in many cases extremely difficult to distinguish between an aortic and innominate aneurism or a solid tumour.

Innominate Aneurism (Pt. I, 261) may be distinguished by the fact that the swelling corresponds rather with the situation of the innominate artery, appearing at the root of the neck on the right side, and often displacing the sternal end of the clavicle; there is less general bulging of the chest walls and a smaller area of dulness behind the sternum; pressure effects are not usually so serious, dyspnœa and dysphagia being less frequently met with; there are often evidences of pressure upon the right brachial plexus, and the radial pulse on the same side is almost always delayed or weakened.

From Solid Tumours, the diagnosis is often extremely difficult, as in both cases there is frequently local dulness on percussion; bulging of the chest walls; swelling and œdema of the face and neck; serious pressure effects, *e. g.* dyspnœa, dysphagia, &c.; then again a solid tumour may exhibit distinct pulsation as in the case of an aneurism.

In *Aneurism* of the aorta, the tumour is always in the course of the vessel; the pulsation is distinctly expansile; a bruit can be heard over the swelling; the area of dulness is usually limited; dysphagia and pain in the back are more common in aneurism than in solid tumours.

In *Solid Tumours,* the swelling is often out of the course of the aorta; if pulsation is present, it is simply of a heaving nature and not expansile; no bruit is

present, unless the growth presses upon some large vessel; the area of dulness is usually much more extensive. Œdema of the arm and chest and frequent hæmoptysis are more common in solid tumours than in aneurism.

Mediastinal Abscess.

784. *Suppuration* in the anterior mediastinum may occur as the result of injury, *e. g.* a penetrating wound, a blow or fall upon the front of the chest, &c.; in other cases, it may be associated with inflammation of the lymphatic glands in this situation, or it may be due to disease of the ribs or sternum; or it may follow some operation about the neck, *e.g.* tracheotomy, removal of tumour, &c.; or occur in cases of general pyæmia.

If the collection of pus is at all considerable, the general symptoms of pressure upon the bronchi, large vessels, or other contents of the thorax, may be very similar to those met with in the case of solid or cystic tumours (**782**).

In many instances, however, no pressure-symptoms, or only very slight ones, will be observed, the abscess forming slowly, without any pain or other sign of inflammation; under these circumstances, there may simply be local dulness on percussion over the sternum, with bulging at some point, either on one or both sides of the sternum, at the root of the neck above its upper border, or even below the xiphoid cartilage.

If the swelling is prominent, fluctuation can often be detected at one of these spots; it will often become more tense and yield an impulse when the patient coughs, and in some cases may even pulsate synchronously with the action of the heart.

If left to itself, a mediastinal abscess may burst internally into the air passages or pleural cavity; or

externally, at one side of, or above, or below, the sternum, the most common situation being on a level with the second rib, on the left of the sternum; more rarely, perforation of the sternum (**751**) is produced.

CHAPTER LXVII

INJURIES AND AFFECTIONS OF THE DIAPHRAGM

785. *Wounds* of the diaphragm may occur from penetrating wounds of the chest or abdomen, *e. g.* in the case of stabs, gunshot injuries, &c.; it may also rupture from severe violence, without any external wound, *e. g.* in severe crushes of the abdomen, or it may be perforated by the end of a broken rib. Wounds.

In most cases wounds of the diaphragm are complicated with injuries of other parts, evidences of which will be present. A peculiar symptom, often observed in cases of this kind, is that the patient complains of a feeling of intense thirst.

In the majority of instances the injury proves more or less rapidly fatal, either from shock or from some secondary complication, *e. g.* peritonitis; if, however, the patient survives, the opening may become closed up, or, if occurring on the left side, it may be followed by the formation of a phrenic hernia (**789**).

786. *Perforation* of the diaphragm, as the result of disease, may occur from the bursting of some fluid accumulation forming in its vicinity, *e. g.* in cases of empyema, abdominal abscess, hydatid cysts, &c., the fluid making its way from the thorax into the abdomen, or in the opposite direction, as the case may be. Perforation.

This accident may occur without any very marked symptoms, or it may be accompanied by severe pain along with evidences of general collapse; at the same

time there will be an alteration in the physical symptoms previously present, with the addition of new ones, involving either the abdomen or thorax, according as the fluid makes its way into one or the other cavity.

In some cases it may be followed by the formation of a phrenic hernia (**789**).

Spasm.

787. The diaphragm may become the seat of *spasm* of either a tonic or a clonic character.

1. Tonic.

Tonic Spasm is met with in cases of tetanus, hydrophobia, strychnia poisoning, &c.; it is attended by pain and a sense of constriction about the pit of the stomach; more or less urgent dyspnœa is present, and if the spasm is prolonged the breathing becomes seriously affected, so that in severe cases death from suffocation results.

2. Clonic.

Clonic Spasm is seen in cases of "hiccough." This condition is generally the result of irritation of or pressure upon some part of the phrenic nerve, either its origin, main trunk, or terminal branches. In cases where the irritation is due to the pressure of some growth, the hiccough is often persistent, and incapable of relief.

In most instances it is simply a symptom of some gastric or abdominal disturbance, being often due to undue distension of the stomach, and sometimes following the introduction into it of certain articles of food.

Hiccough is sometimes met with in cases of cancer of the stomach; it may also accompany meningitis; when occurring in the course of cases of typhoid fever or strangulated hernia, it is often an indication of perforation of the bowel and general peritonitis.

Paralysis.

788. *Paralysis* of the diaphragm is at once produced

in cases of compression or division of the phrenic nerves, or of the spinal cord, opposite to or above the third cervical vertebra, whether from injury or disease, *e. g.* dislocation, fracture, or caries of the upper portion of the cervical spine (Pt. I, **302—304**), &c. If the paralysis is complete, death is almost instantaneously produced, owing to the interference with the function of respiration.

Phrenic Hernia.

789. *Phrenic or Diaphragmatic Hernia, i. e.* a protrusion of some of the contents of the abdomen (usually stomach, colon, or omentum) into the thorax through an opening in the diaphragm, is sometimes met with, usually on the left side, as the presence of the liver prevents its occurrence on the right.

The hernial aperture may be one of the natural openings in the diaphragm, or it may be due to congenital absence of the left leaflet, or it may follow perforation (**786**) or rupture (**785**).

When congenital it may give rise to no symptoms, so that its presence may not be suspected during life.

When following an injury, if not immediately fatal, the symptoms are usually those of intestinal obstruction, *e. g.* sickness, constipation, with evidences of peritonitis, for strangulation of the protrusion generally soon occurs. In some instances unnatural fulness with increased resonance of the left side of the chest has been detected, and there may be dyspnœa, cough, bloody expectoration, &c.

In the majority of instances this complication more or less rapidly proves fatal.

Congenital Defect.

790. *Congenital absence* of a portion of the diaphragm is sometimes met with, usually on the left side. When present the condition is usually accompanied by a phrenic hernia (**789**).

CHAPTER LXVIII

AFFECTIONS OF THE NIPPLE AND AREOLA

Malformations.

791. Various forms of *Malformation of the Nipple* are met with; it may be imperfectly developed or altogether absent, its position being occupied by a depression, in which the milk-ducts terminate; in some cases it is bifid, and occasionally more than one nipple ("supernumerary nipples") is developed on the same breast.

Retraction of Nipple.

792. *Retraction of the Nipple* may be due to various causes:

1. It may be owing to imperfect development, the nipple having never been perfectly formed.

2. In carcinoma (**822**) it is usually a constant and a prominent symptom, owing to the growth, as it contracts, drawing upon the milk-ducts, which terminate at the extremity of the nipple; much less frequently it is met with in cases of non-cancerous tumours, in cases of abscess, &c., especially if situated near the centre of the gland, for under these circumstances, the milk-ducts becoming separated from each other by the swelling, or being involved in it, may become drawn upon, and, as a consequence, retraction of the nipple will result.

3. *Apparent* retraction of the nipple is sometimes seen in cases of non-cancerous tumours, *e.g.* sarcomata, simple cysts, abscess, &c., owing to the fact that as the tumour or swelling increases in size, it grows, or, as it were, projects beyond the level of the nipple, which

simply becomes buried, displaced, or sunken in the swelling.

That this is so is proved by the fact that in cases of tumour, if the swelling is pushed back, the nipple can often be made to protrude again; while in abscess, where apparent retraction of the nipple is present, it will usually regain its normal appearance when the pus is evacuated.

Discharge from Nipple.

793. *A discharge of Fluid from the Nipple* is met with under various conditions:

1. During lactation, when the breast is engorged, slight oozing of milk often occurs, especially on slight pressure; the same condition is frequently met with during the early months of pregnancy, and, independently of that state, it may in exceptional cases occur at the menstrual periods; cf. also Galactorrhœa (**804**).

2. In cases of vicarious menstruation, a discharge of blood from the nipple sometimes occurs at the menstrual periods.

3. In galactoceles (**817**), on pressure upon the swelling, a discharge of milk will usually take place.

4. In simple cysts (**817**), a serous or sanious fluid may discharge from the nipple spontaneously or upon pressure on the swelling.

5. In cystic sarcoma (**821**) and cystic fibroma (**820**) the same condition is very frequently found.

6. In carcinoma (**822**), a scanty serous or sanious discharge is met with in a small proportion of cases.

Ulceration of Nipple and Areola.

794. *Ulceration of the Nipple and Areola* may be due to various causes.

1. Simple inflammation (**795**), in connection with suckling.

2. Paget's disease, or so-called eczema (**797**).

3. Syphilis, *e. g.* chancre or secondary ulceration (**796**).

4. Epithelioma (**798**).

5. In cases of ulceration of the breast (**813**), the nipple and areola frequently become involved.

Inflammation of Nipple and Areola.

795. *Inflammation of the Nipple and Areola* is often met with at the commencement of lactation, especially in primiparæ, and in many instances superficial ulcers and cracks or fissures form, which are extremely painful, and often attended by considerable constitutional irritation.

In some cases superficial abscesses form in or around it (**807**), or the inflammation extending from the nipple to the gland tissue, suppuration may ensue in the breast itself (**808**).

Syphilitic Affections.

796. *Chancres* of the nipple or areola are sometimes met with on the breasts of wet-nurses, usually as the result of inoculation from mucous patches in the mouth or about the lips of syphilitic infants put out to nurse.

Less frequently chancres from the same cause are met with away from the nipple on the surface of the breast itself.

In most cases induration and enlargement of the axillary glands, or of those along the lower border of the pectoral muscle, will be found to be present.

In exceptional cases the nipple and areola may become the seat of *mucous tubercles* or of *secondary ulcers*.

Paget's Disease of Nipple, so-called "Eczema."

797. *Paget's Disease*, or so-called "*Eczema of the Nipple.*"—Attention has been directed by Sir James Paget* to an obstinate eruption of the nipple and areola, usually occurring in women after forty years of

* 'St. Bart.'s Hosp. Reports,' vol. x, p. 87.

age, which is of considerable clinical importance, inasmuch as it is often found to be the precursor of cancer of the breast itself.

In some cases the appearance produced is like that met with in cases of acute eczema, the nipple and areola presenting a florid, intensely red, finely-granular surface, and discharging a copious, clear, yellowish, viscid fluid.

In other cases the eruption is of a dry, scaly, or branny character, more like that met with in chronic eczema or psoriasis.

Either condition may remain limited to the nipple and areola for a considerable period with little alteration, or, less frequently, they may spread to the skin around the areola, causing deeper ulceration of the tissues.

The interesting and important feature in connection with the eruption, which is usually of a very intractable nature, resisting all treatment, both local and general, is that in almost every instance it is eventually followed by the development of cancer in the substance of the gland itself, sometimes after a few months, more often after an interval of several years.

In some cases there is a clear interval of apparently healthy tissue between the affected skin and the deposit of cancer in the breast; in other cases the intervening tissues are distinctly indurated and the seat of cancerous changes, the gland-ducts being distended with masses of squamous epithelium, and the intertubular connective tissue being infiltrated with small cells.*

Another view is that the skin affection is really a form of superficial epithelioma affecting the mouths of the

* Butlin, 'Med.-Chir. Trans.,' vol. 59, p. 107, and vol. 60, p. 153. Morris, 'Med.-Chir. Trans.,' vol. 63.

lacteal ducts, whence it gradually extends along their interior into the substance of the breast itself, setting up similar changes in the glandular structure.*

Cancer of Nipple and Areola.

798. In some cases the nipple and areola may become the seat of *epithelioma*, which usually presents itself in the form of a foul ulcer with hardened base, raised and irregular surface, and prominent, everted, and indurated edges.

The same parts may also, in exceptional cases, become affected with *scirrhus cancer*. Under these circumstances the nipple and areola become infiltrated with a hard, irregular growth, which often projects as a distinct nodular tumour in front of the breast.

In either instance the axillary glands, as in cases of scirrhus of the breast itself, soon become the seat of secondary deposits (**423**).

Other tumours of Nipple and Areola.

799. The nipple and areola are sometimes the seat of *sebaceous cysts*, and rarely of *nævi*.

Changes during Pregnancy.

800. *During Pregnancy* the areola becomes larger and darker in colour, while its surface, especially that portion which lies immediately around the base of the nipple, is studded over and rendered irregular by the prominence of the glandular follicles, owing to the accumulation of sebaceous matter in their interior.

The nipple also becomes of a somewhat darker colour, and more prominent than usual; at the same time there is often a slight secretion of milk, especially upon pressure.

* Thin, 'Lancet,' 179, vol. ii, p. 874, and 180, vol. i, p. 92.

CHAPTER LXIX

INFLAMMATORY AND OTHER AFFECTIONS OF THE BREAST

801. In rare instances, complete *absence* of one or both breasts, "*amazia*," is met with. Anomalies of Development.

Supernumerary Breasts, "*pleiomazia*," are of more common occurrence; they are usually situated on the antero-lateral walls of the chest, but in exceptional cases are found on the abdomen, back, groin, and in the axilla.

802. *Hypertrophy* of the breast, due to simple overgrowth of the gland tissue, is a rare affection; it is usually met with soon after puberty, or in early adult life, and may occur in single as well as married females, being often associated with some menstrual irregularity. Hypertrophy.

It is characterised by a gradual, painless enlargement of one or both breasts, which may attain an enormous size, so that great inconvenience is caused from the mere weight and bulk of the part.

Two forms of enlargement are described; in one, the breast is firm and globular, projecting boldly forwards from the chest, the skin covering it being tense and smooth; in the other, the breast is soft and flaccid, hanging in a pendulous manner from the chest walls, the skin covering it being loose and wrinkled.

803. *Atrophy*, or diminution in the size of the breast, Atrophy.

from wasting of the gland tissue, is often met with at an advanced age. It is sometimes found in early life, as the result of rapidly repeated or protracted lactation, or it may follow weaning; in these cases the atrophy is frequently only temporary, for in subsequent pregnancies the gland often regains its normal condition.

Functional Disorders.

804. *Functional Disorders* of the breast are sometimes met with in connection with lactation, viz.:

1. *Agalactia*, or absence of milk, may depend on imperfect development of the gland, or upon constitutional causes, *e. g.* simple debility.

2. *Galactorrhœa*, or excessive secretion of milk, is the opposite condition to the preceding; the secretion may be so abundant that the milk is constantly dribbling away, or it may continue after the child has been weaned.

3. *Abnormal Secretion:* in exceptional cases, the breasts may secrete milk in young children, in virgins, in males, or at an advanced period of life and quite independently of pregnancy.

4. *Milk-congestion* is the term applied to excessive congestion of the breast with the more solid without the serous constituents of milk; the breast becomes considerably swollen and of firm consistence; in many cases, this condition is followed by inflammation (**805**), and the formation of an abscess (**808**) in the substance of the gland.

5. *Galactocele* or milk tumour, cf. (**817**).

Inflammation of Breast, Mastitis.

805. *Inflammation* may attack the breast at any period of life; it is most commonly met with in adults, especially in connection with those changes which occur in the gland during lactation.

In other cases, it may occur independently of lactation, often in young females about puberty; or it may

be caused by violence, *e. g.* a blow ; it is sometimes seen in infants shortly after birth.

When occurring in connection with lactation, it is generally due to one of two causes, *i. e.* either defective development of the nipple, or prolonged suckling ; in the former case it usually occurs at an early period, in most instances within a month after delivery ; in the latter case, it usually occurs after some months of suckling, being due to prolonged use and consequent irritation of the breast.

The inflammatory process may be of an acute or a chronic nature, and may attack the gland itself, or the connective tissue which lies in front of or behind it.

The symptoms will vary with the seat of the inflammation and its intensity : generally speaking, there will be more or less pain, heat, redness and swelling of the part, with induration and fulness of the gland when this is involved, and tenderness on pressure ; considerable constitutional disturbance is often present, and when occurring in connection with lactation there will usually be interference with the secretion of milk.

In favorable cases the inflammation may subside ; or it may go on to suppuration and the formation of an abscess (**806**).

Abscess of the Breast.

806. *Abscess of the Breast*, or *Mammary Abscess*, is a common result of inflammation (**805**) attacking this part ; it may occur as an acute or a chronic affection, and may be situated in one of three positions, viz. :

1. *Supra-mammary*, in the subcutaneous tissue in front of the gland (**807**).

2. *Intra-mammary*, in the substance of the gland itself (**808**).

3. *Sub-mammary*, in the cellular tissue, which lies behind the gland (**809**).

Suppuration sometimes occurs in connection with carcinoma (**828**), less frequently as a complication of the other forms of new growth met with in the breast.

Supra-mammary Abscess.

807. *Supra-mammary Abscess* is the commonest form of abscess met with in the breast; as its name implies, it is situated in the subcutaneous tissue lying in front of the gland between it and the skin, and it is usually found in the neighbourhood of the nipple and areola. Though often appearing in connection with lactation, as the result of an unhealthy or inflamed condition of the nipple (**795**), yet it is also frequently met with independently of this cause, as it is the form of abscess which is usually found in single females, especially about the age of puberty.

Owing to its superficial situation and also to the fact that the abscess is usually of an acute or subacute nature, the symptoms of inflammation are generally well marked, and when suppuration ensues, fluctuation can be readily detected, so that as a rule there is little difficulty in recognising the condition.

Intra-mammary Abscess.

808. *Intra-mammary Abscess*, or "*Mammary Abscess proper*," is the next most common variety met with in the breast; as its name implies, it is situated in the substance of the gland itself. It may occur either as an acute or a chronic affection.

1. Acute.

1. *Acute Abscess* is most frequently met with in the breast during lactation in connection with an imperfectly developed or inflamed condition of the nipple; the outflow of the milk being obstructed from either of these causes, one or more of the lobes of the gland become congested with milk (**805**), especially the more solid products of this secretion. These, acting as an irritant, set up inflammation in the surrounding parts,

Abscess.

and as a consequence, an abscess frequently forms in the substance of the gland itself.

Abscess when due to this cause is most common in primiparæ, and usually appears shortly after delivery.

In other instances, especially in cachectic women, or those exhausted by rapidly repeated pregnancies, an abscess forms after some months of suckling as the result simply of over-lactation, *i. e.* too prolonged use and consequent irritation of the gland.

An acute abscess situated in the interior of the gland is usually attended by severe local and constitutional symptoms (much more so than in the supra-mammary variety), for the pus, being pent up and confined by the dense fascia, which invests the gland and separates the lobules from each other, compresses the inflamed tissues; consequently intense throbbing pain is produced, which gives rise to great suffering, and considerable constitutional disturbance is generally present.

At the same time, the breast is extremely tender and more or less increased in size; in the early stage, there is often not much external evidence of inflammatory action, the integuments only becoming involved at a later period when suppuration is taking place; under these circumstances, the skin becomes reddened and œdematous, and as the pus makes its way slowly to the surface, fluctuation (which is often obscure and indistinct as long as the pus is pent up at a distance from the surface) can usually be detected.

In some cases, one lobule only of the gland is involved; in others, the inflammation may spread from one lobule to another, so that a succession of abscesses may form as different parts become affected.

If left to itself, an intra-mammary abscess usually

points and discharges its contents in the neighbourhood of the nipple, but the process is always a slow one, owing to the capsule of the gland confining the pus and preventing it readily making its way externally.

2. Chronic.

2. *Chronic Abscess* may be due to the same causes, but it is far more frequently met with, not during lactation but at some considerable interval after delivery, and especially after abortion. Much more rarely it is met with in young and unmarried females, in connection with some uterine derangement, or without any very evident cause.

Occurring under these circumstances and without any apparent inflammatory symptoms, the collection of pus often becomes *encysted*, *i. e.* surrounded and confined by a thick wall of plastic matter thrown out round about it; in other instances, the pus is *diffused* more or less generally throughout the gland.

a. Encysted.

a. A Chronic Encysted Abscess usually presents itself as an indurated swelling, often about the size of a hen's egg, situated deeply in the substance of the gland; its outline, which is fairly regular, is not very distinctly circumscribed, gradually merging in the surrounding tissues.

As a rule, it forms very slowly, often without any pain, remaining for a considerable period, *e.g.* several months, in a stationary condition, or very gradually increasing in size.

Owing to its thickened walls, fluctuation is usually very indistinct or cannot be detected.

In some cases, retraction of the nipple (**792**) is present after a time, and the axillary glands may become enlarged and perceptible beneath the skin, as the result simply of irritation.

From a comparison of these symptoms with those of

Abscess.

solid tumours of the breast, *e. g.* scirrhus (**823**), it will be seen that the two affections resemble one another in many important points, especially as a chronic encysted abscess is often found in females past middle age; and it has several times happened that a breast has been removed under the idea that a new growth was present, when the case has been merely one of abscess.

Diagnosis.—A chronic encysted abscess may usually be distinguished from a solid tumour by attention to the following points.*

"1. That it is almost invariably preceded by impregnation, parturition, or miscarriage.

2. That there is more or less œdema of the subcutaneous areolar tissue covering it.

3. That although it is of slow formation and without pain, it is not distinctly circumscribed.

4. That it is not freely moveable, but rather incorporated with adjacent parts.

5. That elasticity, or even deep fluctuation, may be commonly felt at one part of it."

In all cases, where there is any doubt as to the true nature of the case, recourse should be had to exploratory puncture, for the presence of pus will, of course, render the diagnosis certain.

b. Chronic Diffused Abscess.—In other cases, when the collection of pus is more diffused, involving the whole or greater part of the gland, so that a considerable swelling is produced, it is often extremely difficult to distinguish between it and a rapidly-growing sarcoma (**821**), or encephaloid (**826**) tumour; for on the one hand, an abscess may form with very little pain, and without any evidence of inflammatory action; on the

b. Diffused.

* Erichsen, 'Science and Art of Surgery,' 7th Edit., vol. ii, p. 581.

other hand, a sarcoma or encephaloid tumour (even though of a solid nature) may be so soft and elastic that it is often extremely difficult to say whether or not fluctuation is present.

In all obscure cases, recourse should be had to exploratory puncture, for the presence or absence of pus will of course clear up all doubt.

Submammary abscess.

302. *Submammary abscess* is not of such common occurrence as either of the two preceding varieties of abscess of the breast.

In this variety, pus forms in the connective tissue behind the gland, between it and the pectoral muscle.

The abscess, which may be either of an acute or a chronic nature, may occur in connection with lactation, or, independently of that condition, it may appear as a primary affection, or in connection with caries or necrosis of the subjacent ribs, or in cases of empyema perforating the thoracic walls.

The formation of an abscess in this situation is usually attended by considerable pain, but as a rule there is not at first much external evidence of inflammatory action, owing to the depth from the surface of the seat of suppuration.

The appearance produced is, however, usually very characteristic, for the breast being pushed forwards by the collection of pus is rendered conical and projecting, and at the same time the subcutaneous veins are often distended and prominent beneath the skin.

The depth of the pus from the surface, in the early stage, renders it extremely difficult to detect fluctuation, but on careful examination it will often be found that the breast rests, as it were, on a water cushion, or something soft and elastic, and if it is pushed back-

wards indistinct fluctuation can often be distinguished at some point at its margin.

If left to itself, the pus gradually tends to make its way to the surface, pointing at some part of the circumference of the gland, usually at its lower and outer side, and in some cases pointing takes place in more places than one. More rarely the pus makes its way directly forwards, between the lobules of the gland, and under these circumstances it may point in the neighbourhood of the nipple.

As the abscess approaches the surface, evidences of inflammatory action will be perceptible externally, the skin becomes reddened and œdematous, and fluctuation can then be readily detected.

Chronic or Lobular Induration.

810. *Chronic Induration* of a portion, or of the whole, of one or both glands, is a condition frequently met with, especially in unmarried females from thirty to forty years of age; it may also occur in married females, usually in those who are sterile, and in most instances it is associated with some catamenial irregularity.

The induration, which is due partly to engorgement of the acini or cæcal terminations of the milk-ducts with masses of epithelium, partly to chronic inflammatory or cirrhotic changes in the surrounding tissues, most commonly affects only a portion of one or both glands, in some cases only a single lobule, hence it is often described as "*lobular induration.*"

Under these circumstances, if the induration is pinched up or grasped from above downwards, or from side to side, between the finger and the thumb, a distinct "induration" or hardened mass can be plainly felt in the substance of the gland, simulating the presence of a solid tumour; if, however, the palm of the hand,

or palmar surface of the fingers, is pressed flatly against the breast as the patient stands, or still better if she assumes the recumbent position, the induration disappears and can no longer be felt.

The induration in some cases is very tender, the slightest pressure causing considerable pain, which very frequently is not confined to the breast but shoots up the neck, behind to the back, and along the shoulder and arm.

There is usually an entire absence of any inflammatory symptoms; in some cases, pain is complained of, often of a paroxysmal or neuralgic character, and it may often be at once excited on making pressure on the middle or anterior branches of the intercostal nerves, which supply the breast, as they issue from the chest; in other cases, no pain or discomfort is present, and the induration is only discovered quite by chance.

With the exception of the catamenial irregularity, and possibly some slight excitation of the nervous system, there is not as a rule any disturbance of the general health.

Diagnosis.—Chronic induration of the breast, when single and involving only a portion of one gland, is very liable to be mistaken for a solid tumour, *e. g.* adeno-fibroma (**820**), scirrhus (**823**), &c., but it can generally be distinguished by attention to the following points, viz.: its frequent connection with some derangement of the generative organs; the tenderness of the induration upon pressure; the character of the pain when present, especially if it is produced on making pressure upon the nerves which supply the breast; the fact that the induration is "more tough than hard," and not so nodular, nor so well-defined, as would be the case in a

new growth; nor is it attended by retraction of the nipple or adhesion of the skin, as in cases of scirrhus.

The most certain sign is, however, that to which attention has been directed, viz. the fact that the induration can be distinctly felt on pinching up the gland between the finger and thumb, but that it disappears when the hand is laid flatly on the breast.

Of course in cases where there is more than a single induration in one or both breasts, the diagnosis is usually evident, for tumours are very rarely multiple.

In most instances, the induration disappears under proper treatment; in exceptional cases, however, as the result of prolonged irritation, cancerous changes may take place in the hardened mass.*

Neuralgia.

811. *Neuralgia, Irritable Mamma, Mastodynia,* are the terms applied to an affection of the breast, very closely allied to the preceding (**810**), usually occurring in young girls, or in middle-aged, unmarried females, who are suffering from some derangement of the menstrual functions, and often in connection with an hysterical temperament.

In most cases, nothing abnormal can be distinguished in the condition of the gland, beyond the fact that occasionally it appears slightly fuller and firmer than usual, presenting a somewhat congested appearance.

The pain, which is usually the most prominent symptom, is of a neuralgic character, shooting down the arm, along the neck, and behind the back; it is generally paroxysmal, coming and going suddenly, and being often worse when the patient is suffering from fatigue.

Tenderness on pressure is another prominent symptom, sometimes so extreme that the mere contact of

* "On Indurations of the Breast becoming Cancerous," Paget, 'St. Bart. Hosp. Reports,' vol. xiv, p. 65.

the dress cannot be borne; as a rule, it is more evident on merely touching the part than upon making firm pressure upon it.

In some cases, this condition is due to the presence of a small, fibrous tumour (**820**).

Gummata.

812. *Gummata* are rarely met with in the female breast; they usually appear as indolent, moderately hard, painless swellings, presenting characters similar to those described (**406**).

As in other situations, they are very liable to soften and break down, giving rise to a deep circular ulcer, with sharp, clean-cut, perpendicular margins, very different to the indurated ulcer with thickened, raised, everted edges met with in cases of scirrhus (**831**), or the fungating, ulcerated surface sometimes found in cases of sarcoma (**831**). A gummy tumour of the breast, before it has broken down, may be mistaken for a new growth, but in most cases the history or presence of other evidences of syphilis will point to the true nature of the affection.

Ulceration.

813. *Ulceration* of the breast, independently of those conditions which produce ulceration of the nipple and areola (**794**), may be due to other causes, viz.:

1. Cancerous, in connection with scirrhus (**830**) or encephaloid cancer (**826**).

2. Sarcomatous, in connection with sarcomatous tumours (**830**).

3. Syphilitic, from the breaking down of a gumma (**812**) over or in the substance of the gland.

Sinuses, Milk-fistula.

814. *Sinuses* of a very obstinate nature are often met with about the breast, owing to non-closure of the cavity of an abscess, which has formed in this situation.

After supra- (**807**) or intra-mammary (**808**) abscess, they are often situated in the neighbourhood of the

nipple; after submammary abscess (809), they are usually situated at the periphery of the gland, especially about its lower and outer margin, and in many instances more than one opening is present.

When following an intra-mammary abscess and occurring in connection with lactation, the discharge of pus is often mixed with milk, constituting a "*milk fistula.*"

CHAPTER LXX

TUMOURS OF BREAST *

Tumours and Swellings of Breast.

815. In the following table the chief forms of tumours or swellings met with in the breast are mentioned.

- Tumours and Swellings of Breast
  - Simple Cysts
    - Retention . . : Serous (817). Mucous (817). Lacteal (817).
    - Of New Growth: Hydatid (818).
  - Solid Tumours (or containing Cysts) . .
    - Adeno-fibroma (820).
    - Sarcoma (821).
    - Carcinoma (822).
    - Rare forms of Tumour: Pure Adenoma, Myxoma, Chondroma, Angioma, &c. (829).
  - Inflammatory Swellings . . . .
    - Abscess (806).
    - Lobular Induration (810).
    - Gummata (812).

Tumours of the Breast, excluding the simple inflammatory swellings, may be divided into two great classes, viz. 1. Simple cysts, and 2. Solid tumours, or those which in addition to solid matter contain cysts in their interior.

Simple Cysts.

816. *Simple Cysts, i. e.* tumours consisting of a simple sac, filled with more or less fluid contents, may be sub-

* In the remarks on Tumours of the Breast, I have largely availed myself of the excellent work by Dr Samuel W. Gross, entitled, 'A Practical Treatise on Tumours of the Mammary Gland,' 1880.

Simple Cysts.

divided into two classes, viz. *Retention cysts* (817) and *Cysts of new growth* (818).

1. Retention Cysts.

817. 1. *Retention Cysts.* — When from obliteration, constriction, or obstruction of one of the lacteal ducts, any part of the glandular apparatus (ducts or acini) behind the lesion becomes, as the result of accumulation of secretion, distended and converted into a cyst or sac, a "retention cyst," as it is termed, is produced.

The causes which may produce this condition are various, *e.g.* imperfect development of the nipple; blocking up of the ducts from inflammation in the breast or nipple, or from contraction of the fibrous stroma of the breast, or from the presence of small vegetations or thickenings of the walls of the ducts, &c.

Three different varieties of retention cysts are met with, viz. serous, mucous, and lacteal cysts.

a. Serous Cysts.

a. Serous Cysts or Sero-Cysts, the most common variety, are usually met with in the breast during its period of functional activity, *i.e.* between the ages of twenty-five and forty years; on this account, they are sometimes termed "*evolution cysts.*" They may be either single or multiple, and may be situated near the nipple, or scattered over the surface or through the substance of the breast. Owing to the fact that they are generally due to dilatation of the lacteal sinuses or large ducts, produced in one of the ways described, sero-cysts are most commonly met with near the nipple, and in the majority of cases, only one tumour is evident, for even if a number are present, one as a rule attains a larger size than the others, which remain small and therefore are not apparent.

A sero-cyst usually presents itself as a firm, elastic, painless, slowly growing tumour, with smooth outline, of globular shape, and about the size of a walnut,

situated near the nipple, or at a little distance from it, and embedded in the substance of the breast; the tumour is freely moveable beneath the skin, which is non-adherent, and also on the subjacent parts; in many cases, it is so extremely tense that it is difficult to say whether fluctuation is present.

The contents of the cyst usually consist of a clearish, serous fluid, which in some cases becomes of a reddish or brownish tinge, and in many instances there is a discharge of fluid from the nipple, especially if pressure is made upon the tumour.

The tumour usually remains in a stationary condition for a considerable period, causing little trouble or inconvenience; in some cases it may, if left alone, gradually increase in size, and ulceration of the superjacent skin eventually taking place, it may burst and discharge its contents; under these circumstances, the cyst cavity may become obliterated and a natural cure ensues, or the fluid may re-accumulate and a recurrence of the tumour takes place.

The diagnosis of this affection is in many cases extremely difficult, especially when the tumour lies at some distance from the surface, for it may then closely simulate a solid growth; under these circumstances, recourse to exploratory puncture will often be required before the true nature of the case can be definitely ascertained.*

If, however, the cyst is situated superficially in the neighbourhood of the nipple and attended by a dis-

* "Few diagnoses in surgery are more difficult than that between some serous cysts and some cancers in the breast, and the sign mainly to be relied on is the presence or absence of elastic tension on firm, deep pressure over the middle of the 'lump.'"—Paget, 'St. Barth. Hosp. Reports,' 1878, p. 67.

charge from it, the diagnosis is not generally very difficult.

b. Mucous Cysts.

b. Mucous Cysts are usually met with in the breast after the cessation of menstruation and the period of functional activity of the gland, *i. e.* after the age of forty-five years; hence they are sometimes described as "*involution cysts.*"

They are usually due to dilatation of the acini and terminations of the ducts, which are liable to become constricted as the fibrous stroma of the gland contracts; consequently they are more commonly met with at the periphery and posterior aspect of the breast than near the nipple; they may be either single or multiple, and usually contain in their interior a mucoid fluid.

Cysts of this nature, of minute size, and having given rise to no trouble during life, are often found in the breasts of women past middle age, if examined after death; if, however, one or more of the cysts enlarge and attain any dimensions, the symptoms and appearance produced will be very similar to those found in cases of serous cysts.

c. Lacteal Cysts

c. Lacteal Cysts or Galactoceles, i. e. cysts containing milk in their interior and due either to dilatation of one of the lacteal sinuses or larger ducts, or to rupture of a duct and extravasation of milk into the surrounding tissues, are of very rare occurrence.

A galactocele always forms during lactation, usually very suddenly and without any pain, tenderness, or evidence of inflammatory action; it presents itself as a globular or ovoid fluctuating tumour, which at times reaches a considerable size, containing as much as several pints of fluid.

If left to itself, the serous portion of the milk becoming gradually absorbed, the contents of the cyst

may become converted into a cheesy mass, which may eventually become firm and hard, so that the tumour may simulate a solid growth, or chronic encysted abscess (**808**).

The diagnosis of this affection in recent cases is usually easy; the sudden appearance of the tumour during lactation; its fluid character; the fact that it often enlarges during each act of suckling, and that in many cases on pressure upon it, a few drops of milk will escape from the nipple, will all point to its true nature.

2. Cysts of new growth. Hydatid Cysts.

818. *Hydatid Cysts* are in rare instances met with in the breast.

The general symptoms of the tumour are very similar to those met with in the case of a serous cyst (**817**), and it is usually impossible to distinguish between the two affections without recourse to exploratory puncture, when the clear, thin, watery character of the fluid, which often contains the heads and hooklets of the Echinococci, will reveal the nature of the swelling.

Solid Tumours, or containing cysts.

819. The *solid Tumours*, or those which in addition *contain cysts* in their interior, most frequently met with in the breast, are three in number, viz. adeno-fibroma (**820**), sarcoma (**821**) and carcinoma (**822**).

The rarer varieties of mammary tumour are pure adenoma, myxoma, enchondroma, &c. (**829**).

Adeno-fibroma.

820. *Adeno-fibroma* is the term applied to a tumour consisting of fibrous tissue, intermingled with which are normal or variously altered glandular elements.

Growths of this kind are also described as *adenoceles, adenoid tumours, chronic mammary tumours, glandular tumours, adenomata, fibromata*, &c.

Adeno-fibromata usually present themselves as solid growths, or they may contain cysts in their interior.

A *Solid Adeno-fibroma* is usually met with in young and often unmarried females, appearing in most cases before thirty years of age (often about the twenty-third year), and consequently at that period when the breast is in a young and active condition. 1. Solid.

It usually presents itself as a small, moveable, well-defined tumour, of firm consistence, and of round, oval, or lobulated shape, situated most commonly near the periphery of the gland, especially at its upper and outer part, where it often appears to float beneath the skin, which is perfectly free over it; much less frequently it is situated near the nipple, or behind the gland itself.

The tumour usually increases very slowly in size, and in many instances, after attaining the dimensions of a walnut or pigeon's egg, remains in a stationary condition for a considerable time.

As a rule it is not attended by any pain, though occasionally tenderness is present, and the tumour becomes slightly enlarged and painful at the menstrual periods.

Adeno-fibromata are usually single, though occasionally there may be more than one tumour in the same or in both breasts.

In exceptional cases a tumour of this nature may, after remaining for a considerable time, *e. g.* several years, of small size, and in a stationary condition, suddenly enlarge with great rapidity; the increase of size, under these circumstances, will usually depend upon the development of cysts in the interior of the tumour.

Adeno-fibromata are, as a rule, of an essentially innocent nature, not being accompanied by any implication of the lymphatic glands or secondary de-

posits in internal organs, and not returning after removal.

When recurrence does occur, it merely indicates either that there is a tendency to the formation of multiple tumours, or that some nodule, which was present in the breast and overlooked at the time of operation, has become further developed.

The *characteristics* of solid adeno-fibromata may be summed up as follows:

1. *Age.*—Their frequent occurrence in young and unmarried females.

2. *Growth.*—Slow and painless; often stationary for a time.

3. *Size.*—Small.

4. *Outline.*—Well-defined and circumscribed; smooth or lobulated.

5. *Consistence.*—Firm and solid.

6. *Connections.*—Freely moveable; often, as it were, "floats" in the gland; no adhesions to skin or deep tissues.

7. *Negative Symptoms.*—No retraction of, or discharge from, nipple; no glandular implication; no tendency to ulceration of skin; no interference with general health; no tendency, as a rule, to recurrence.

Diagnosis.—"The uniform hardness of such tumours may distinguish them from cysts, and from both cancers and simple or cirrhotic indurations; they may generally be known by their giving a sensation when we press them alternately on one border and another, as if they moved *in* the surrounding gland-substance, not *with* it.

The difference is difficult to describe, sometimes difficult to perceive; but it is a real one, due probably to these tumours, however hard, being encapsuled, and

not, as are cancers and indurations, continuous with the surrounding substance of the gland." *

Small growths, the size of a pea or bean, consisting mainly of dense fibrous tissue, either single or multiple, are sometimes met with in the breast, frequently situated on its surface, and connected with the cutaneous nerves.

Under these circumstances they are often attended by considerable tenderness and pain, frequently of a neuralgic character, resembling in their general symptoms the so-called *neuromata*, or "*painful subcutaneous tubercles*" often found in other parts of the body (**528**).

2. Cystic.

A *Cystic Adeno-fibroma, i. e.* one containing cysts in its interior mixed up with the solid growth, usually occurs at a later period of life, in most cases after thirty-five years of age, and, therefore, when the mammary gland is well matured.

Tumours of this kind, in their general history and symptoms, resemble very closely cystic sarcomata (**821**), from which it is often impossible to distinguish them before removal; they differ, however, in their less malignant nature, for if completely removed they are not, as a general rule, followed by recurrence.

Sarcomata.

821. *Sarcomata*, or tumours consisting of embryonic tissue (*i. e.* of cells which resemble the undeveloped cells of embryonic connective tissue) are of frequent occurrence in the breast, originating in the connective tissue which lies between the ducts and acini of the gland.

The cells, which constitute the main portion of the growth, present variations in size and form, being usually either rounded or spindle-shaped, the latter being most common.

* Paget, 'St. Bart. Hosp. Reports,' 1878, p. 68.

They may present themselves either as solid tumours, or may contain cysts in their interior.

1. Solid. *Solid Sarcomata* are usually met with in females between thirty and forty years of age; they may be situated at any part of the breast, appearing more commonly at its periphery than near the nipple; but as they grow, they usually tend to involve the whole or greater part of the gland.

They usually present themselves as more or less rapidly-growing tumours, in some cases rounded or ovoid, in others distinctly lobulated. Their consistence depends upon their structure, those composed mainly of spindle-cells being firm and hard, while the round-celled growths are often soft and elastic.

Their rate of growth and volume also depend on the same cause, the round-celled tumours increasing in size much more rapidly, and attaining much larger dimensions than the spindle-celled; *e. g.* the former often reach the size of an adult head in a few months; the latter grow much more slowly, or, after increasing very gradually for some time, they may all at once rapidly enlarge; sudden increase in bulk under these circumstances is generally due to the development of cysts in the interior of the tumour.

As they increase in size, they usually remain mobile, and free from either superficial or deep attachments; the skin does not become adherent; there is no discharge from the nipple, which retains its normal condition unless it becomes buried in the growth (**792**), and as a rule there is no implication of the axillary lymphatic glands.

In some cases, however, when the bulk of the tumour is considerable, and therefore usually in round-celled growths, the skin, becoming stretched and thinned from

the pressure beneath, may ulcerate and give way, and under these circumstances the tumour often fungates and protrudes through the opening in the integument (cf. **830**).

2. Cystic.

Cystic Sarcomata, or those which in addition to solid matter also contain cysts, are met with at about the same age as the solid growths. The cysts may be formed in one of two ways. 1. Most commonly they are due to dilatation of the ducts and acini of the gland; owing to the pressure of the new growth upon their walls and the accumulation of secretion in their interior, these become distended and transformed into cavities of various sizes and shapes, which contain a serous, mucous, or sanious fluid; in many instances, there is also a growth of the tumour itself into the interior of the cysts in the form of papillary or cauliflower-like masses, which may more or less completely fill up and obliterate their cavities ("intra-cystic growths"). 2. In other cases, the cysts, or "cystoid cavities" (as they are then termed), are due not to dilatation of the ducts and acini, but to softening and breaking down from fatty and mucoid degeneration of the substance of the growth itself, or to hæmorrhages into its interior.

Cystic sarcomata are more commonly met with near the nipple than at the periphery of the gland; they present themselves as rapidly growing tumours (increasing in size much more quickly than the solid growths), lobulated and of unequal consistence, being firm at some points and soft and fluctuating at others; in many cases, the cysts project on the surface of the gland, so that it presents a bossed or botryoidal outline, often distinctly visible beneath the skin; under these circumstances, the skin over the most prominent cysts

is thinned and discoloured, being often of a bluish tinge, and in many instances the subcutaneous veins are enlarged and prominent.

As in the solid growths, the skin may ulcerate and give way, and the tumour may then protrude through the opening as a fungating mass which often bleeds, the "fungus hæmatodes" of the older surgeons, cf. (**830**).

In many cases of cystic sarcoma, there is a discharge of fluid from the nipple of a clearish or sanious character, especially on making pressure upon the tumour.

Retraction of the nipple is not usually present, though it may become sunken or buried in the growth (**792**).

Diagnosis from Solid Sarcoma.—A cystic sarcoma can be usually distinguished by the more rapid growth of the tumour; its larger volume; its unequal consistence, fluctuation being often present in places; its more distinctly lobulated outline, which is often bossed; the fact that a discharge from the nipple is often present; the greater tendency to prominence of the subcutaneous veins and to ulceration of the skin, with protrusion of the growth in the form of a fungating mass; the greater tendency to deformity of the nipple, which is often buried in the growth.

Diagnosis of a *rapidly growing Sarcoma* from *Chronic Abscess*, cf. (**808**); from *Encephaloid Cancer*, cf. (**826**).

Course of Sarcomata.—These tumours are, in many cases, essentially of a malignant nature, the degree of malignancy depending upon the structure of the growth; thus, while a small, slowly-growing, spindle-celled sarcoma, especially if occurring in a young female, will probably not recur after complete removal,

round-celled growths or rapidly growing cystic tumours are especially liable to do so.

In these cases, recurrence may take place locally, either at or near the cicatrix where the tumour was removed. In the majority of cases, however, recurrence takes place in some internal organ, most commonly in the lungs, dissemination being effected by means of the blood; this is owing to the fact that the walls of the blood-vessels in the tumour being formed by embryonic tissue like that of the growth itself, the cells readily gain admission into the veins and are then carried along by the blood-stream to the lungs and other internal organs, where they become arrested and act as foci of secondary infection. The lymphatic glands usually escape infection, owing to the fact that the lymphatic vessels do not come into such close relationship with the cells of the growth as is the case in carcinoma.

822. *Carcinoma, i. e.* "a growth consisting of cells of an epithelial type, grouped together irregularly without any intercellular substance, within the alveoli of a more or less dense fibroid stroma," attacks the mammary gland more frequently than any other form of tumour. Carcinoma.

It usually appears in one of two forms, viz. either as scirrhus or encephaloid cancer, the former being by far the most common.

Scirrhus and encephaloid differ from each other in the relative proportion of cells and stroma, and also in the size of the cells themselves.

In *scirrhus*, the stroma is in excess, predominating over the cells, which are smaller than those met with in encephaloid.

In *encephaloid*, the cells are largely in excess, there being relatively only a small proportion of stroma, as

compared with what is found in scirrhus; consequently this variety attains much larger dimensions and is of much softer consistence than scirrhus.

A third variety of cancer, *i. e.* colloid, is very rarely met with in the breast.

1. Scirrhous.

823. *Scirrhous Cancer*, the variety most commonly met with, usually attacks the breast between forty and fifty years of age; it is never met with before puberty, and only very rarely under thirty years of age.

Scirrhus usually presents itself in the early stage as a small, circumscribed tumour, of hard consistence, and with an uneven or nodulated surface; at first it may be unattended by any pain, and though fixed in the substance of the gland, it is freely moveable beneath the skin and on the subjacent parts.

The tumour is most frequently situated in the neighbourhood of the nipple, or at the upper and outer part of the gland.

Less frequently it commences as an infiltration of the entire gland, which from the first presents a hard, rugged, nodular, irregular condition.

As the tumour increases in size, which as a rule it does gradually and slowly by infiltrating the surrounding tissues, symptoms are produced of a very different nature to those met with in non-cancerous tumours; consequently they are of great value in helping to distinguish the nature of the growth.

The *earliest* of these symptoms are *dimpling or pitting of the skin, retraction of the nipple,* and *pain;* they are all due essentially to the same cause, viz. the tendency which the fibrous stroma of the growth has to contract, and, as it does so, to incorporate or draw into itself the adjacent structures and tissues. It is also owing to this tendency to contract that scirrhus does not, as a rule, attain

any great dimensions, for in ordinary cases the tumour is smaller than the gland, or portion of the gland, which it has replaced, and it is somewhat exceptional to find the growth much larger than a good sized orange.

1. *Dimpling or pitting of the skin* over the tumour is best seen when the growth is situated superficially; to examine for it, the breast should be gently raised by applying the hand to its lower surface; if this is done, distinct pitting or dimpling of the skin (not unlike that seen in cases of fatty tumour) can often be detected.

This dimpling in the early stage is quite distinct from the adhesion of the skin to the growth which is met with at a later period, being due not to infiltration of the skin with cancerous elements, but to shortening of the fibrous bands or processes of the superficial mammary fascia ('suspensory ligaments of the breast' of Sir A. Cooper), which pass from the under surface of the skin into the interior of the gland, and which becoming involved in the growth, are drawn upon and shortened as it undergoes cicatricial contraction.

2. *Retraction of the Nipple* is another symptom which is usually present at an early stage, and is due to a similar cause, viz. shortening of the milk-ducts which terminate at its extremity (**792**); though most commonly met with in connection with scirrhus, retraction of the nipple may also be due to other causes (**792**).

3. *Pain* of an acute, darting, or neuralgic character, often shooting down the arm and in the parts round about the breast, is generally another early symptom, and is also due to a similar cause, viz. pressure upon the nerves which become drawn in and involved in the growth.

As the disease progresses, other symptoms are produced, due partly to local infiltration, partly to dissemination through the lymphatic vessels; these *later*

symptoms are *invasion of the skin and subjacent tissues*, and *implication of the lymphatic glands;* sooner or later the characteristic *cancerous cachexia* frequently becomes established.

4 *Invasion of the Skin* is due to extension outwards of the growth and infiltration of the cutaneous tissues with cancerous elements.

As a consequence, the skin over the tumour becomes fixed and adherent, so that if an attempt is made to raise it up, instead of being free and moveable, it will be found attached to the growth; under these circumstances, it often appears to be thinned and puckered up, becoming of a purplish or dusky tint and affected with superficial desquamation.

In other cases, the skin over and in the vicinity of the growth is studded over with distinct cancerous nodules or tubercles; or it may be rigid and brawny, forming a kind of cuirass (cancer 'en cuirasse'); or drawn in and extremely contracted so as to resemble a cicatrix; at a later stage ulceration may ensue, giving rise to a scirrhous ulcer (**830**).

5. *Invasion of the Subjacent Tissues* is usually a somewhat later symptom than implication of the skin and is due to the same cause, *i. e.* extension of the growth and infiltration of the parts beneath, viz. cellular tissue, pectoral muscle and fascia, &c., with the cancerous elements.

As a consequence, the tumour becomes fixed and immoveable, so that it cannot be raised up from the chest walls.

6. *Fixity of the Tumour* is therefore another symptom which is usually diagnostic of cancer.

Later on, the deeper tissues, *e. g.* intercostal muscles, pleura, and ribs may all become involved, and under

these circumstances evidences of effusion into the pleural cavity will often be present.

7. *Implication of the Lymphatic Glands* is usually found soon after the skin becomes involved, though in some cases it is met with at an earlier period; those first affected are usually the axillary (**423**), and after a time the ones above and below the clavicle, as well as the glands behind the sternum, often become involved.

In many instances, a distinct cord of indurated lymphatics can be felt running along the lower border of the pectoral muscle from the breast to the axilla.

When the glands become involved, œdema of the skin over the breast is often present, and in advanced cases the same condition is often present in the arm on the corresponding side (**505**).

8. *The Cancerous Cachexia* also becomes established as the disease advances; this is simply a condition of gradually increasing exhaustion attended by loss of flesh, general debility and languor, and more or less rapidly terminating in death; the fatal result may be due to the exhausting effect of the local disease, especially if ulceration occurs and this is attended by hæmorrhage; or it may be due to secondary deposits in other parts, *e. g.* the liver, lungs, pleura, uterus, osseous system, &c.

Recurrence after Removal.—In the majority of cases, even if the tumour is removed, recurrence of the disease will more or less rapidly take place, either locally or in the axillary glands; less frequently it occurs in some internal organ, so that in this respect scirrhus differs markedly from sarcomatous tumours (**821**).

Duration of Life.—Dr. Gross* shows that the average duration of life in cases not operated upon and allowed to run their natural course is a little over two years (*i. e.*

* Op. cit., p. 163

twenty-seven months ; in cases, on the other hand, when death occurs after operation, the average duration of life is a little over three years (*i. e.* thirty-nine months) ; consequently surgical interference adds on an average about a year of life, in addition to the physical and mental comfort which follows the removal of the cancerous mass.

Diagnosis of Scirrhous Cancer and Sarcoma.

824. In the following table the main points of diagnosis between scirrhous cancer and a solid sarcoma (or one which only contains a few cysts of small size in its interior) are mentioned.

Differential Diagnosis of Scirrhous Cancer and Sarcoma of Breast.

	Carcinoma.	*Sarcoma.*
Age of Patient .	Usually over 40 years; average age about 48 years.	Usually 35 to 40 years of age.
Situation . . .	More common near nipple than at periphery of gland.	More common at periphery of gland than near nipple.
Outline	Nodulated and irregular; not distinctly circumscribed.	Rounded, ovoid, or lobulated ; generally circumscribed.
Consistence . .	Of hard and almost stony consistence.	In some cases firm and solid, in others soft and elastic.
Mobility on Subjacent Tissues	After a time becomes fixed and adherent.	Usually remains free.
Rate of Growth .	Continuous, steadily progressing.	Variable; may grow slowly, or remain stationary for a time, or enlarge very rapidly.
Volume	Usually small; often not larger than the portion of breast which is replaced by the growth.	Variable; often attains a considerable size.
Retraction of Nipple	Usually present.	Usually absent; though if tumour is large, nipple may be buried in the growth (792).

	Carcinoma.	*Sarcoma.*
Discharge from Nipple	Rarely present.	Never present (unless the tumour contains cysts).
Superjacent Skin	Soon becomes adherent from infiltration, and often ulcerates.	Non-adherent; may become thinned from pressure and then ulcerate.
Ulceration (if present)	Deep and excavated (831).	A fungating surface (831).
Subcutaneous Veins	Rarely enlarged.	Enlarged and prominent, when tumour is of large size.
Axillary Glands	Soon involved from infiltration; become enlarged and indurated.	Rarely involved, and then as a rule only enlarged from simple irritation.
Supra-clavicular Glands	Often involved, subsequently to axillary.	Never involved.
Pain	A prominent symptom; sharp and lancinating.	Often absent, or very slight.
General Health	Evidence of cancerous cachexia, often present after a time.	Usually good, unless secondary deposits occur in internal organs.
Recurrence after Removal	Almost invariably occurs, either locally or in axillary glands; less frequently in internal organs.	May or may not occur; if it does, not in axillary glands, but either locally or in some internal organ.

825. The main points of distinction between scirrhous cancer and adeno-fibroma (**820**), chronic encysted abscess (**808**), and lobular induration (**810**), have been already described. Diagnosis of Scirrhous Cancer.

For the distinction between scirrhous and encephaloid cancer, cf. (**826**).

826. *Encephaloid* or *Medullary Cancer* is of far less common occurrence* than the scirrhous variety, from 2. Encephaloid.

* Encephaloid is met with in about 5 per cent. of all varieties of cancer (Gross).

which, in addition to its structure (**822**), it differs clinically in several important particulars, viz :

Age: It is often met with at a somewhat earlier period of life, a number of cases occurring before forty years of age.

Growth: The rate of growth is much more rapid, and the tumour may attain a large size in a few months, or even weeks.

Volume : The volume of the tumour is much larger, and it often attains considerable dimensions, *e. g.* the size of an adult head.

Consistence: The tumour is much softer, being in many cases elastic, and almost fluctuating, so that it is very liable to be mistaken for a chronic abscess (**808**).

Prominence of the subcutaneous veins over the tumour is often present.

In other respects, *e. g.* retraction of the nipple, adhesion of the skin, with tendency to ulceration, fixation of the tumour from infiltration of the subjacent tissues, rapid implication of the lymphatic glands, &c., it resembles scirrhus.

When ulceration is present "the sore is deep and excavated, and liable to hæmorrhage, but it does not fungate" (Gross).

Encephaloid cancer is the most malignant of all tumours of the breast, running a more rapid course, and if removed, being more speedily followed by recurrence, either locally, in the lymphatic glands, or in internal organs.

Diagnosis.—Encephaloid cancer is very liable to be mistaken for a chronic diffused abscess of the breast (cf. **808**), also for a rapidly-growing, round-celled sarcoma (**821**). From the latter affection it may usually be distinguished by the fact that in sarcoma there is

generally no retraction of the nipple, no fixation of the tumour, no implication of the lymphatic glands. If ulceration of the skin occurs, it is generally from pressure, not from infiltration, and presents the appearance described in table (**831**).

Cystic Carcinoma.

827. *Cystic Carcinoma.*—As in cases of sarcoma (**821**), cysts (usually of small size) may develop in cancerous tumours, from softening, and degenerative changes occurring in the growth itself, *e. g.* from mucoid and fatty degeneration of the epithelial cells.

Suppurating Carcinoma.

828. *Suppurating Carcinoma.*—In some cases, *e. g.* when cancer takes on rapid growth or develops during pregnancy or lactation, and is "attended by an extensive small-celled infiltration of its framework," suppuration ensues, and "an abscess may form at the expense of the infiltrated connective tissue, the epithelial cells not participating in the morbid process" (Gross).

Under these circumstances local evidences of inflammatory action, followed by the formation of an abscess, will in many cases be evident externally.

Rare Forms of Mammary Tumour.

829. *Rare forms of Mammary Tumour.*—The following varieties of tumour are very rarely met with in the breast:

Pure Adenoma, viz. a tumour due simply to excessive production of the glandular tissue, and consisting mainly of epithelial cells, which are limited and separated from the investing connective tissue (which is not increased in amount, as in an adeno-fibroma (**820**)) by the presence of a limiting membrane, is very rarely met with.*

"The criterion of adenoma is the presence of the

* Out of 649 cases of tumour of the breast, collected by Gross, only two were of this nature.

membrana propria, which separates the investing epithelium from the surrounding connective tissue. When this is broken through, and the epithelium grows as solid plugs into the stroma, the tumour ceases to be an adenoma, and becomes a carcinoma" (Gross).

Myxoma, sometimes confused with colloid cancer, is of still rarer occurrence.

Other forms of tumour, described as occurring in exceptional cases, are lipoma, chondroma, osteoma, neuroma, and angioma.

Ulceration of Breast in connection with Tumour.

830. *Ulceration of the Breast* is frequently met with in cases of tumour of the breast, especially in connection with sarcomatous or cancerous growths; less frequently it is met with after the spontaneous rupture of a serous cyst (**817**).

1. *Sarcomatous Ulcer.*—Ulceration of the skin over a sarcomatous tumour (**821**) is not unfrequently met with in cases where the growth has attained a considerable size.

Under these circumstances, as the result simply of subjacent pressure, the overlying skin becoming thinned and inflamed, often sloughs and gives way, and, as a consequence, a distinct ulcer is formed over the most prominent part of the tumour.

Characteristics.—The ulcer is more or less circular in shape; in some cases, several are present, separated by bridges of healthy skin; the margins are smooth, even, and free from discoloration or infiltration with sarcomatous elements, being unattached to the growth, though often somewhat elevated by it, as it projects beneath.

The base of the ulcer is in some cases deep and excavated, and composed of broken-down growth, but much more frequently there is a fungating protrusion

of the tumour-tissue in the form of a soft, irregular mass through the opening in the skin; this is usually accompanied by a more or less purulent discharge, and is liable to be attended from time to time by considerable hæmorrhage, constituting the "fungus hæmatodes" of the older surgeons.

2. *Cancerous Ulcer.*—The ulceration of the skin so frequently met with in cases of scirrhus is due, not to pressure of the subjacent growth as in sarcoma, but to actual infiltration of the skin with cancerous elements; consequently it is usually preceded by adhesion of the skin to the growth.

Characteristics.—The ulcer is more or less irregular in shape and usually single; its margins, which are thickened, indurated, raised, and often everted, are adherent to the growth; the surrounding skin, which is also adherent, is discoloured and infiltrated for some distance; the base of the ulcer is generally deeply excavated, forming a crater-like cavity, and the surface, which is foul and sloughy, discharges a fœtid puriform or sanious fluid; "although carcinoma is said to throw out fungous masses, I fancy that the statement is traditional, as I cannot find a single example confirmed by minute examination" (Gross).

In the following table, the main points of distinction between these two forms of ulceration are mentioned.

Diagnosis of Sarcomatous and Cancerous Ulceration.

831. *Differential Diagnosis of Sarcomatous and Cancerous Ulceration.*

	Sarcomatous Ulcer.	*Cancerous Ulcer.*
Shape	More or less circular.	Irregular.
Edges	Smooth, even, and on level with surrounding skin; non-adherent to the growth.	Irregular, raised, thickened, hard, and everted; adherent to the growth.
Surrounding Skin	Healthy and non-adherent; free from discolouration and infiltration.	Adherent, discoloured, and infiltrated.
Surface of Ulcer .	An irregular fungating mass.	Excavated, foul, and sloughy.

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